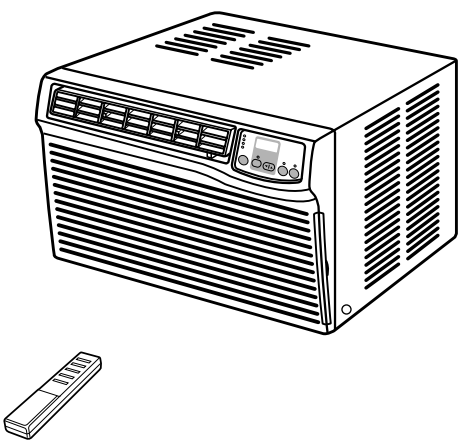


SHARP SERVICE MANUAL

S3203AFR12CX/



AIR CONDITIONER

MODELS **AF-R100CX** **AF-R120CX**

In the interest of user-safety the air conditioner should be restored to its original condition and only parts identical to those specified should be used.

TABLE OF CONTENTS

	Page
SPECIFICATIONS	2
WIRING DIAGRAM	3
EXTERNAL DIMENSIONS	3
OPERATION INSTRUCTIONS	4
INSTALLATION INSTRUCTIONS	6
DISASSEMBLING PROCEDURE	8
HOW TO REPAIR REFRIGERATION	12
ELECTRICAL COMPONENT TEST	14
MICROCOMPUTER CONTROL SYSTEM	15
TROUBLESHOOTING GUIDE	19
COOLING LOAD ESTIMATE FORM	24
RUNNING CONDITION	26
PACKING AND ACCESSORIES	27
REPLACEMENT PARTS LIST	28

SHARP CORPORATION

This document has been published to be used for after sales service only.
The contents are subject to change without notice.

SPECIFICATIONS

Models		AF-R100CX	AF-R120CX
Cooling capacity	BTU/h	10000	12000
Moisture removal	Pints/h	2.7	3.3

ELECTRICAL DATA

Phase		Single	
Rated frequency	Hz	60	
Rated voltage	Volts	115	
Rated current	Amps	9.0	11.5
Rated input	Watts	1000	1200
Power factor	%	97	91
EER	BTU/Wh	10.0	10.0

COMPRESSOR

Type	(Hermetically sealed rotary type)		
Model, Remarks	44R251AC-AJS, 840 W	44B124HX1EF, 1000W	

REFRIGERANT SYSTEM

Evaporator	Slit fin, Grooved tube, Ø 9.53 mm Hair pin		
Condenser	Louver fin, Grooved tube, 7mm Hair pin		
Control O.D. x I.D. x Length x Q'ty(mm)	Capillary tube 2.7 x 1.4 x 400 x 1	Capillary tube 2.7 x 1.2 x 800 x 2	
Refrigerant volume R-22(OZ)	18.3(Factory charged)	19.4(Factory charged)	

NET DIMENSIONS

Width Height Depth	inches(mm)	22-1/16(560) x 14-3/4(375) x 24-5/16(617)	
Net Weight	lbs	83	85

GROSS DIMENSIONS

Width Height Depth	inches(mm)	25-25/32(655) x 18-29/32(480) x 27-7/8(708)	
Gross Weight	lbs	94	96

FAN SYSTEM

Indoor side(Evaporator)	Centrifugal fan		
Outdoor side(Condenser)	Propeller fan		
Air flow rate(indoor side)	CFM	(High/Med/Low) 304 / 254 / 223	(High/Med/Low) 318 / 254 / 219

OTHERS

Safety devices	Compressor: Overload relay Fan motor: Internal thermal protector		
Air filter	Polypropylene net		
Power cord length	ft	4.3	
Power plug type	125V, 15A		

ELECTRICAL PARTS

Running capacitor	250V-60µF	370V-50µF	
Fan capacitor	250V-6µF x 2	250V-6µF x 2	
Thermistor	15k at 78°F		
Fan motor	ARS030ZUEA/SHP(MLA895)	ARS030ZUEA/SHP(MLA895)	
Overload relay	MRA4789-9053	MRA98693-12007	

WIRING DIAGRAM

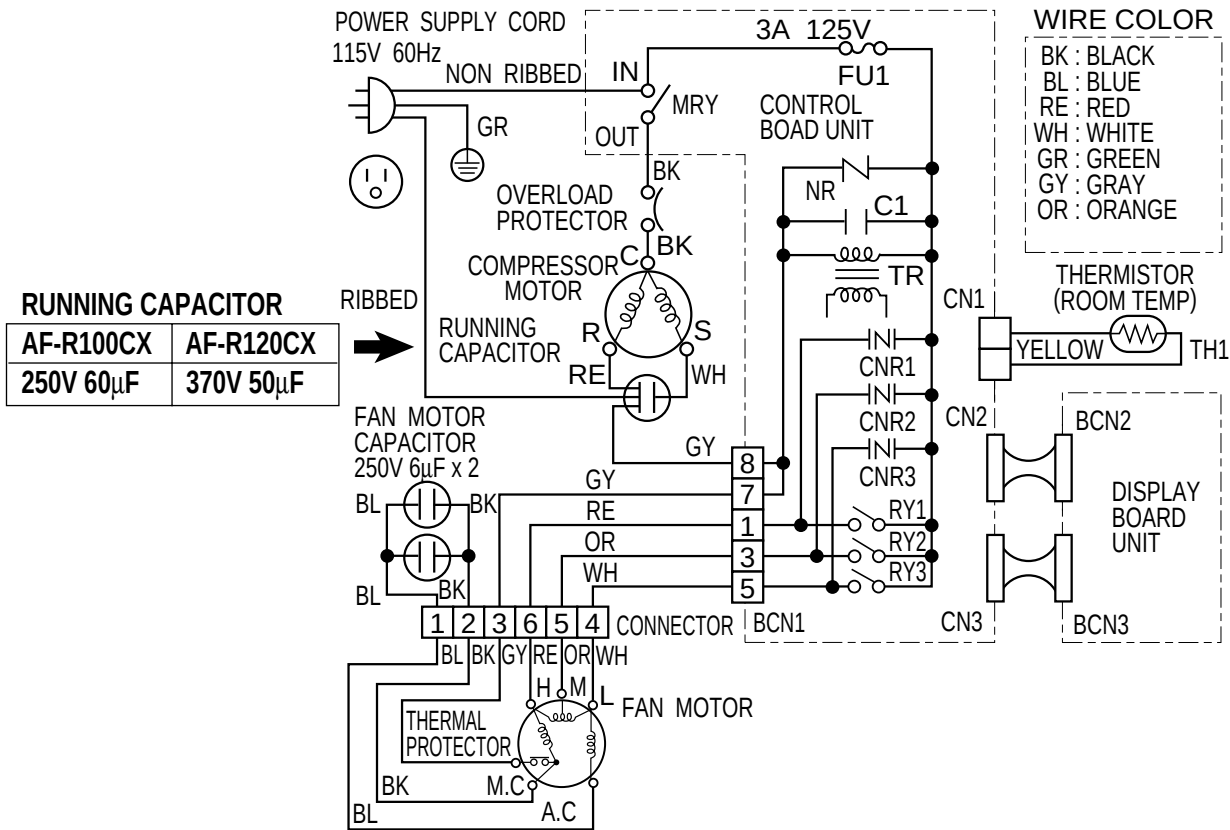
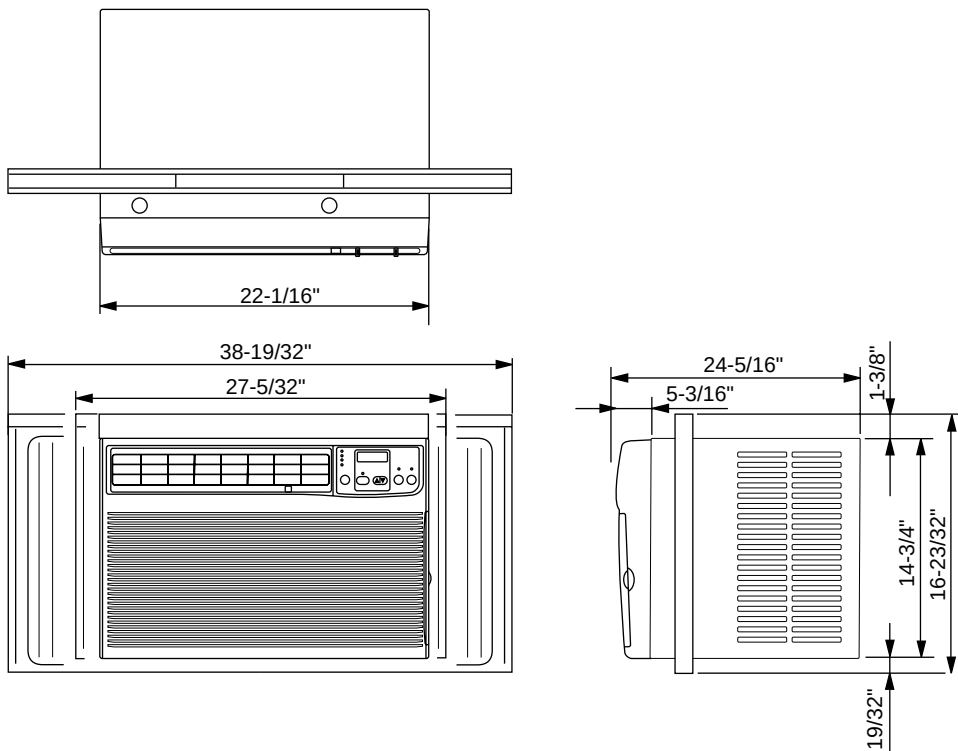


Figure W-1

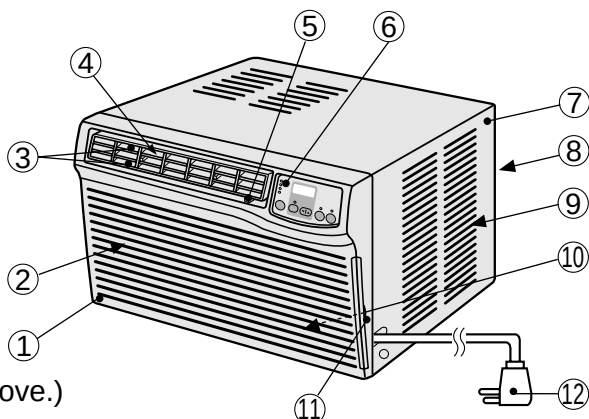
EXTERNAL DIMENSIONS



OPERATION INSTRUCTIONS

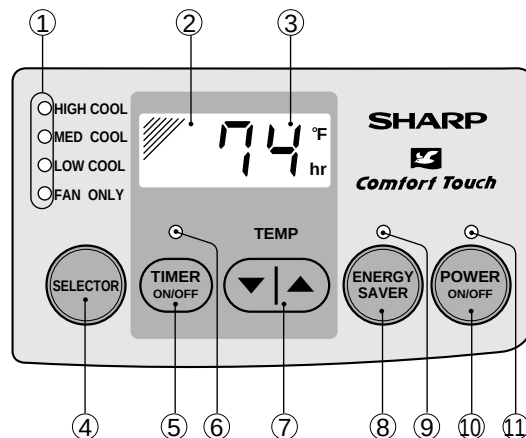
UNIT

- ① Front panel
- ② Air inlet (Indoor side)
- ③ Louvers
- ④ Air outlet (Indoor side)
- ⑤ Exhaust lever
- ⑥ Control panel
- ⑦ Cabinet
- ⑧ Air outlet (Outdoor side)
- ⑨ Air inlet (Outdoor side)
- ⑩ Filter (Pull the filter handle to the right to remove.)
- ⑪ Filter handle
- ⑫ Power cord



CONTROL PANEL

- ① SELECTOR indicator
- ② Receiver window for remote control signal
- ③ Display
- ④ SELECTOR pad
- ⑤ TIMER ON/OFF pad
- ⑥ TIMER indicator
- ⑦ TEMPERATURE setting pad
▼ ---Lower temp.
▲ ---Raise temp.
- ⑧ ENERGY SAVER pad
- ⑨ ENERGY SAVER indicator
- ⑩ POWER ON/OFF pad
- ⑪ POWER indicator

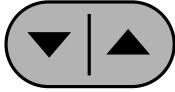


HOW TO OPERATE

COOLING OPERATION

Procedure	Pad	Display / Indicator
1. Touch POWER ON/OFF pad. • The unit is preset at 74°F and HIGH COOL. This will show in the display when the power is first turned on.		• POWER indicator and SELECTOR indicator (HIGH COOL) will light.
2. To turn off the unit, touch POWER ON/OFF pad again.		• POWER indicator and SELECTOR indicator will go off.

TO CHANGE TEMPERATURE SETTING

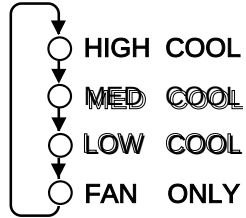
Procedure	Pad	Display / Indicator
During cooling operation Touch the TEMPERATURE setting pad to adjust the temperature setting. • It can be set within the range of 64°F to 86°F.	TEMP  ▼ ---Lower temp. ▲ ---Raise temp.	 • Display will change as you touch the pad.

The latest temperature setting will be memorized and will appear on the display the next time the unit is turned on.

NOTE:

In cases of power outages or when the unit is disconnected; when the power is restored or the unit is plugged in, the unit and display will return to the preset conditions of 74°F and HIGH COOL. The unit will not automatically turn back on. The user must touch POWER ON/OFF to resume operation.

TO CHANGE FAN SPEED

Procedure	Pad	Display / Indicator
During operation Touch SELECTOR pad and select the desired fan speed.		• SELECTOR indicator will light in order as you touch. 

NOTES ON FAN SPEED

- HIGH COOL** Fan and cooling at maximum performance.
Unit is preset to HIGH COOL when first turned on after unit is plugged in.
- MED COOL** Fan operates at medium speed; cooling power at medium.
- LOW COOL** Cooling for sleeping comfort with low fan speed.

FAN ONLY OPERATION

This setting can be used to circulate air whenever cooling is not desired.
The fan will operate at medium speed.

Procedure	Pad	Display / Indicator
During operation Touch SELECTOR pad and select FAN ONLY.		• SELECTOR indicator FAN ONLY will light, and the temperature display will go off. After 5 seconds, the compressor will stop and the unit will operate in FAN ONLY mode.

When the unit is turned off, the last fan speed will be stored in memory.
The next time the air conditioner is used, the memorized fan speed will start automatically.

ENERGY SAVER

During normal operation, the thermostat automatically controls cooling and the fan runs continuously. When the **ENERGY SAVER** is selected, the thermostat automatically controls cooling and the fan automatically stops when the compressor is not operating. (Fan will stop 30 seconds after the compressor stops.)

Procedure	Pad	Display / Indicator
During cooling operation		• ENERGY SAVER indicator will light.
1. Touch ENERGY SAVER pad.		
2. To cancel, touch ENERGY SAVER pad again.		• ENERGY SAVER indicator will go off.

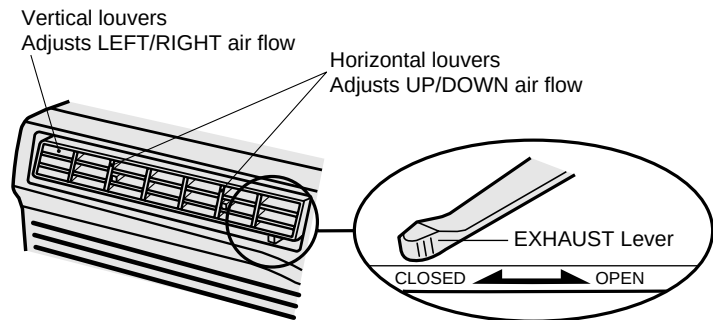
NOTE: **ENERGY SAVER** cannot be set during **FAN ONLY** mode operation.

TO CHANGE AIR FLOW DIRECTION

Adjust the louvers to change the direction of air flow for uniform and efficient cooling of the room.

EXHAUST

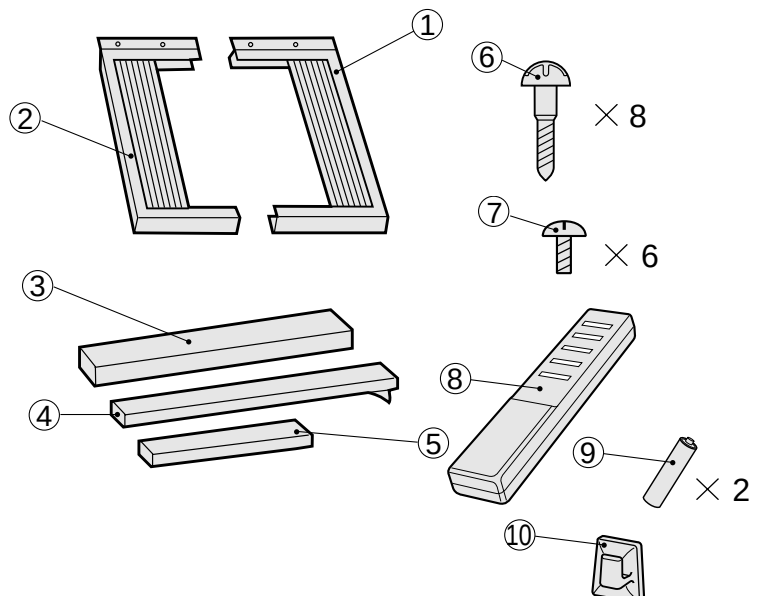
If air in your room is stale, set the **EXHAUST** lever to the **OPEN** position. This will exhaust stale air to the outside. The **EXHAUST** lever should normally be kept in the **CLOSED** position during cooling for maximum efficiency.



INSTALLATION INSTRUCTIONS

ITEMS PACKED WITH THIS UNIT

No.	Accessories	Q'ty
①	Right closure assembly	1
②	Left closure assembly	1
③	Window sash foam seal	1
④	Window sash foam seal (adhesive type)	1
⑤	Bottom gasket	1
⑥	Screws(L=1", 25.4mm)	8
⑦	Screws(L= 13/ 32", 10mm)	6
⑧	Remote control	1
⑨	Battery	2
⑩	Remote control hook	1



SUGGESTED TOOLS

1. Screw driver (medium size Phillips)
2. Tape measure or ruler
3. Knife or scissors

INSTALLATION

These models can also be installed through the wall with the optional through the wall mounting kit, model AZ-80WK. To order this kit either contact your dealer or call 1-800-BE-SHARP.

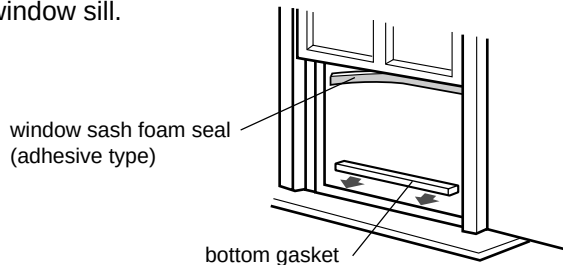
The wall opening dimensions for through the wall installation are:

25" (635mm) (W) x 17 -1/4" (438mm) to 17-3/4" (451mm) (H) x 4" (102mm) minimum (D).

Complete instructions are included with the wall mounting kit.

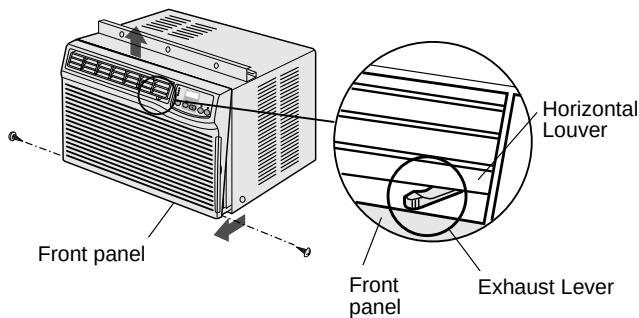
WARNING: Make sure the unit is turned off and unplugged before working.

- 1-1. Cut the window sash foam seal (adhesive type) to the proper length and attach it to the underside of the window sash.
- 1-2. Attach the bottom gasket to the outer side of the window sill.



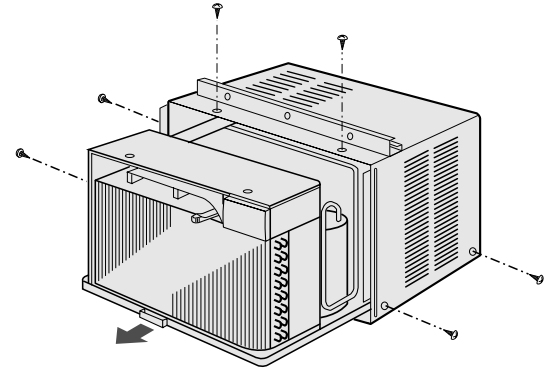
- 2-1. Unscrew the 2 screws at the corners of the front panel. Keep them as they will be used later.
- 2-2. Remove the front panel by pulling the front panel at the lower corners towards you about an inch. Next lift it up and pull it towards you.

CAUTION: Take care not to damage the exhaust lever when removing the front panel.

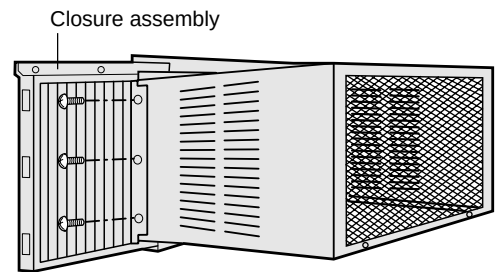


- 3-1. Unscrew the 6 stopper screws of the cabinet. Keep the 4 screws from the top and front, as they will be used later.
- 3-2. Slide the chassis out from the cabinet by pulling on the hand hold located at the bottom center of the chassis.

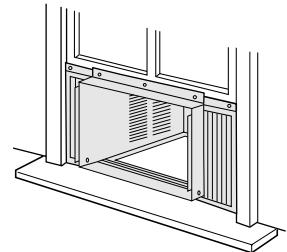
CAUTION Do not remove any material (ex. styrofoam, etc.) from inside the unit.



4. Insert the right closure assembly and the left closure assembly into the top angle and the bottom channels. Secure the right and left closure to the cabinet with 6 of the provided screws. (L= 13/32", 10 mm)

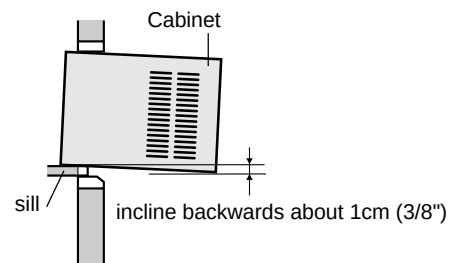


5. Open the window sash and place the cabinet on the sill. Close the window sash securely behind the top angle. If there is space between the bottom channel and the sill, fill the gap with a thin board or other hard filler.

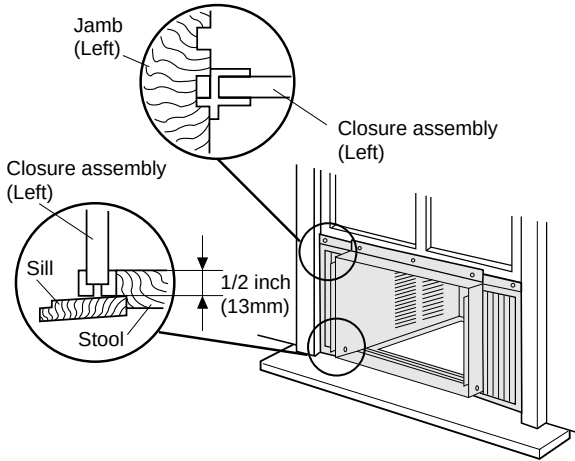


WARNING:

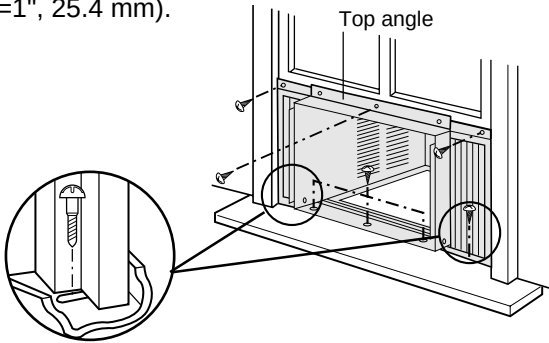
At this step, make sure the cabinet is inclined approximately 1 cm (3/8") to the back. If the cabinet is not properly inclined, the water collected in the bottom tray during operation will not drain properly and may flow into the room where the air conditioner is installed.



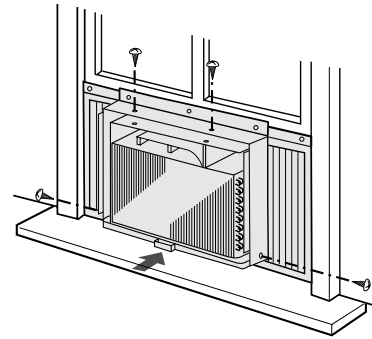
6. Insert the closure assemblies on both sides into the rails of the jamb.



- 7-1. Secure the cabinet to the window stool with 3 screws (L=1", 25.4 mm), working from the inside of the cabinet.
7-2. Secure the top angle and the closure assemblies to the window sash with 3 screws (L=1", 25.4 mm).
7-3. Secure the closure assemblies to the sill with 2 screws (L=1", 25.4 mm).



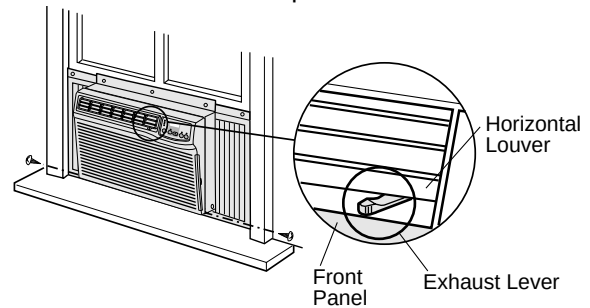
- 8-1. Slide the chassis back into the cabinet.
8-2. Replace the 4 screws removed in step 3 to the top and side of the cabinet.



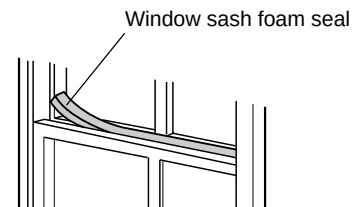
- 9-1. Replace the front panel. Slip the exhaust lever through the opening between the horizontal louver and the front panel then, hook the cabinet top.

CAUTION: Take care not to damage the exhaust lever with the front panel.

- 9-2. Screw the front cabinet on at the bottom corners with 2 screws removed in step 2.



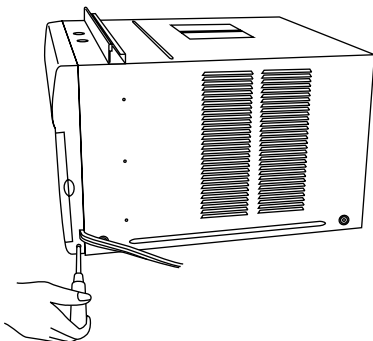
10. Cut the window sash foam seal to the proper length and seal the opening between the top of the inside window sash and the outside window sash.



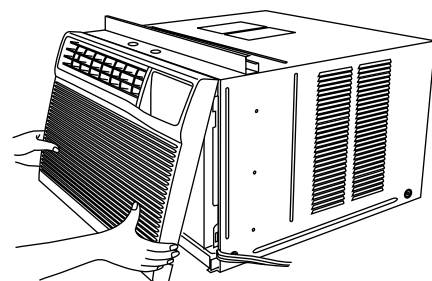
DISASSEMBLING PROCEDURE

CAUTION: DISCONNECT THE ROOM AIR CONDITIONER FROM THE POWER SUPPLY BEFORE ANY SERVICE

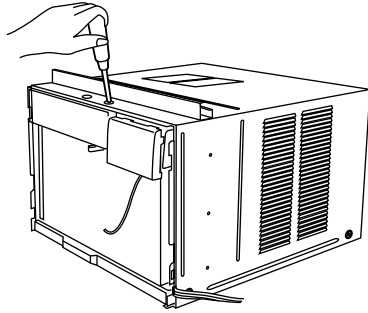
1. Unscrew the two screws holding the front panel on each side.



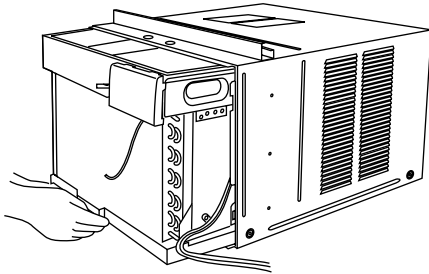
2. Remove the front panel by pulling it at the lower corner toward you about 1 inch and next lift up and pull it toward you.



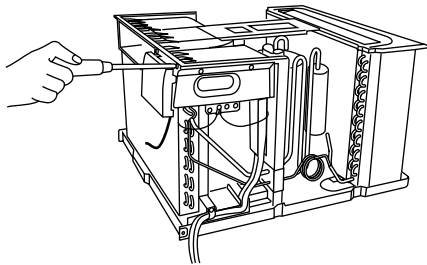
3. Unscrew the four screws holding the cabinet.
Two screws are on top side.
Two screws are on each side.



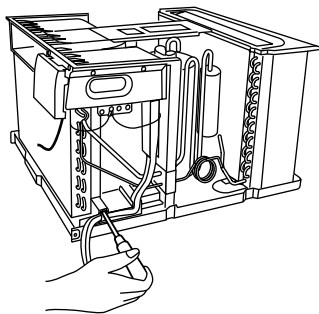
4. Slide the chassis away from the cabinet by pulling on each corner of the base pan.



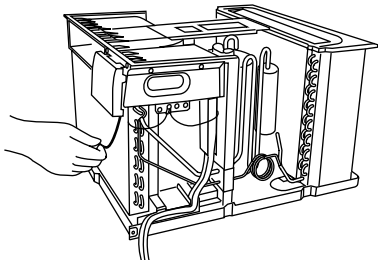
5. Unscrew the four screws holding the control unit.
Two screws are on front side.
Two screws are on right side.



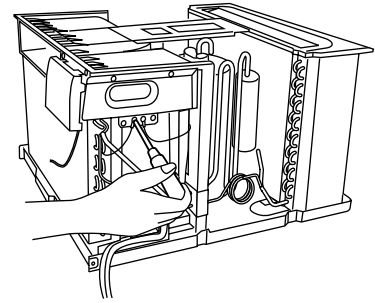
6. Unscrew the one screw holding the power supply cord.



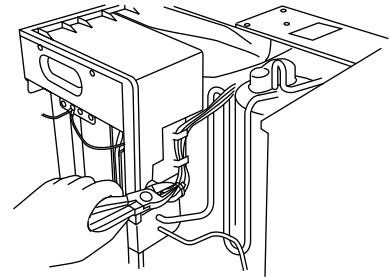
7. Unscrew the one screw holding the wire holder.
Pull out thermistor holder.



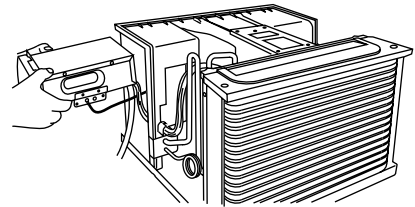
8. Unscrew the one screw holding earth wire .



9. Cut the fixing band holding the wires.

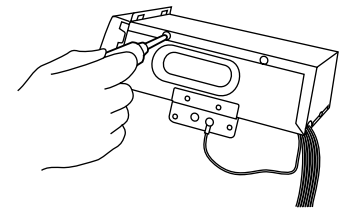


10. Remove the control unit.

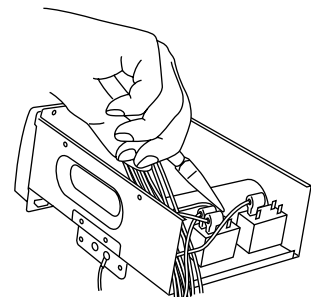


11. Unscrew the four screws holding control box cover.
Two are on the right side, one is on the left side, one is on the back side.

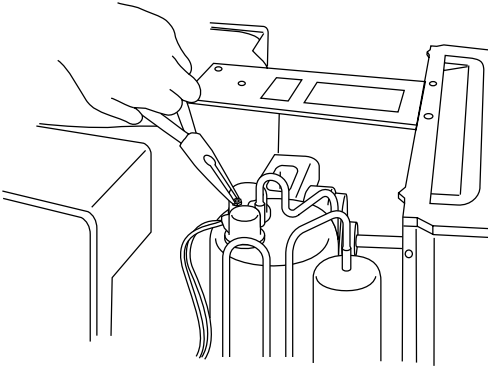
CAUTION: DISCHARGE THE FAN MOTOR CAPACITOR AND RUNNING CAPACITOR BEFORE TOUCHING THOSE CAPACITORS OR OTHER COMPONENTS OR WIRING.



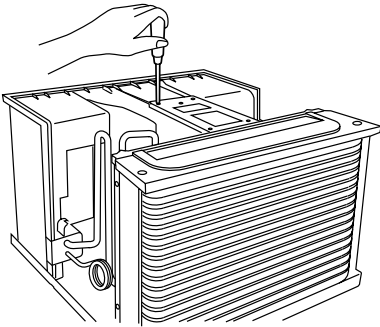
12. Detach each terminals of fan motors by using long-nose pliers.



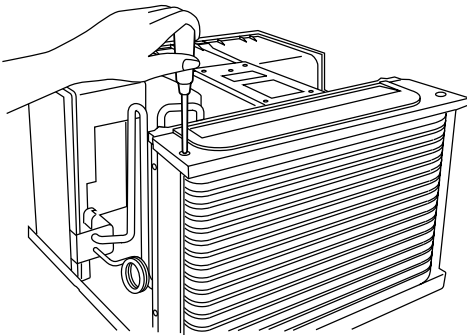
13. Remove the putty and unfasten the one nut at the top of compressor holding the terminal cover. Then remove the wiring connector of the compressor cord.



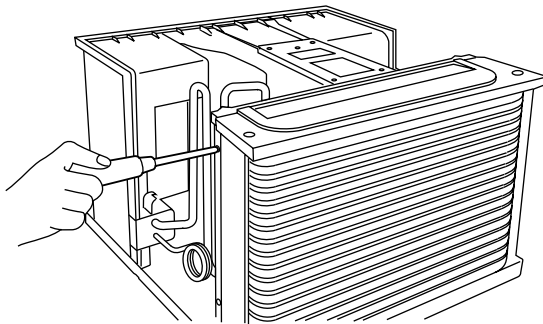
14. Unscrew the five screws holding the connecting stay.



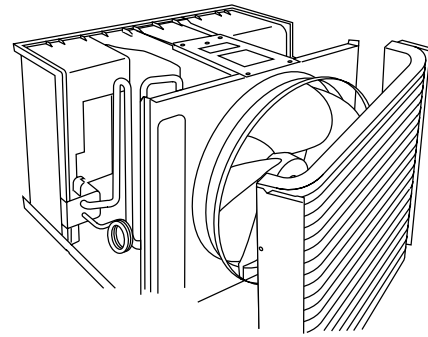
15. Unscrew the two screws holding the shroud cover.



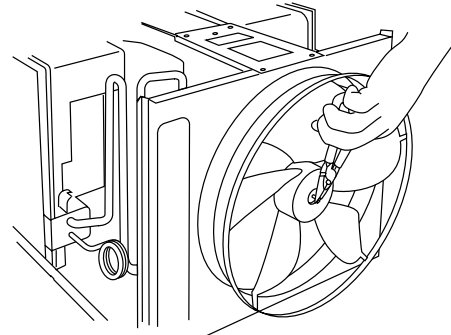
16. Unscrew the six screws holding the condenser and condenser shroud. Two screws are on the back side. Four screws are on the each side. Unscrew the two screws holding the condenser cover .



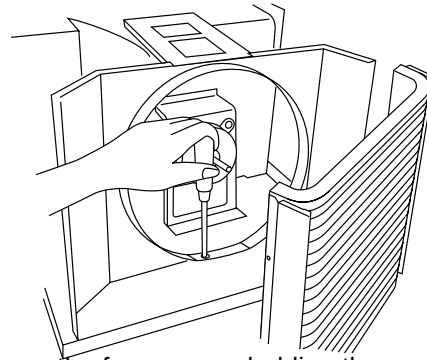
17. Remove the condenser by lifting up about 1 inch and pull it toward you and move to right.



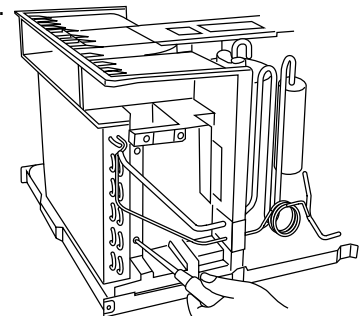
18. Unfasten the one nut holding propeller fan by rotating it clockwise. And remove the propeller fan.



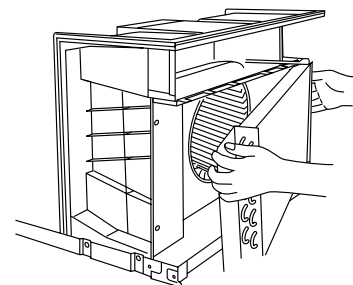
19. Unscrew the three screws holding condenser shroud. **Note: Seal three female screws with silicone sealer before re-installing.**



20. Unscrew the four screws holding the evaporator. Two are on left side. Two are on right side.

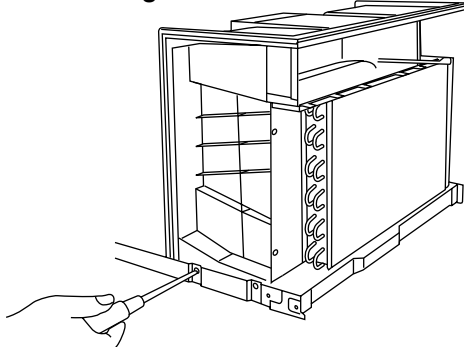


21. Remove the evaporator.

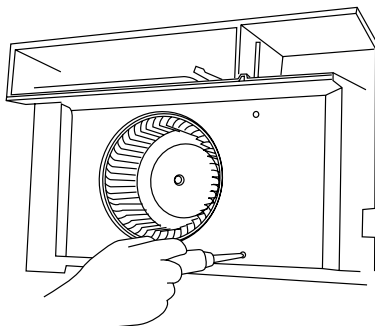


22. Unscrew the four screws holding the bulkhead.
Three screws are on the each side.
One screw is on the bottom side.

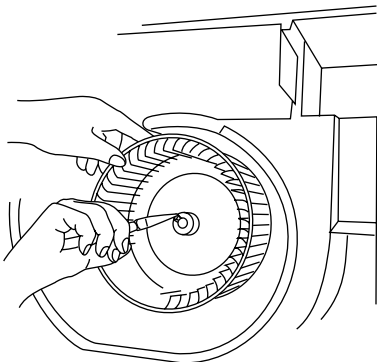
Note: Seal one female screws with silicone sealer before re-installing.



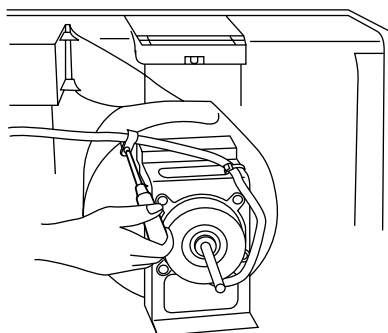
23. Unscrew the two screws holding the orifice



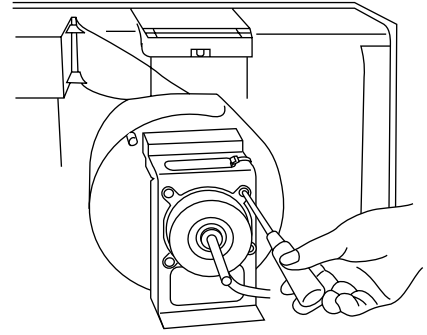
24. Unfasten the one screw holding the centrifugal fan by rotating it counterclockwise.



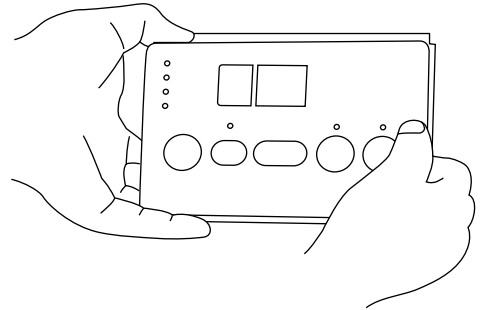
25. Unscrew the one screw holding the fan motor lead wire.



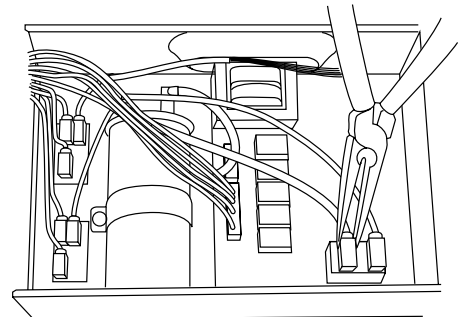
26. Remove the fan motor by unscrewing the four screws that have large head holding it with bulkhead.
Note: Torque is 7 - 10 kgf.cm at re-installing.



27. Unscrew the three screws holding the printed wiring board.

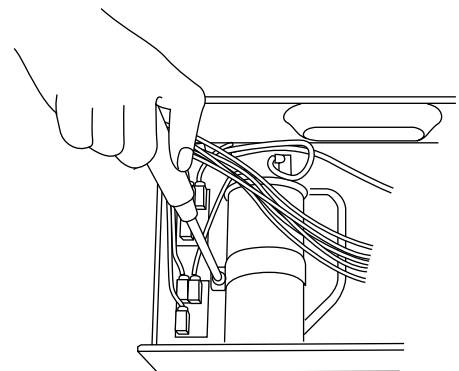


28. Detach terminals by using long-nose pliers.



29. Unscrew the five screws.

Two screws are holding the fan motor capacitors.
One screw is holding the capacitor clamp.
Two screws are holding the transformer.
Unfasten the three spacers of the control box unit.



HOW TO REPAIR REFRIGERATION

Before sealed system work can be preformed a refrigerant recovery EPA and LOCALLY approved certification is required, additionally, EPA and LOCALLY approved refrigerant recovery equipment is required.

SEALED SYSTEM REPAIR

Sealed system repairs should be properly diagnosed before entering into a repair of the system.

It is important to follow proper procedures when doing a system repair for safety reasons and that the repair will result in a restoration of the system to proper factory standards.

SAFETY REMINDERS

- 1) Do not heat any system component with an open flame for any reason.
- 2) Do not solder until you are sure that all refrigerant has been removed from the system.
- 3) Do not heat the charging cylinder with an open flame. Use warm water only and do not exceed 125°F (not too hot to keep your hand in.)
- 4) Do not over fill any charging cylinders, as they could explode when over filled.
- 5) Use proper wrenches.
- 6) Use safety goggles when working with refrigerants.
- 7) Keep a fire extinguisher within easy reach.
- 8) Watch flame direction when soldering so as not to burn clothing, wiring or other components.
- 9) Solder in a well ventilated area. If a high concentration of freon is present, an open flame will create phosgene gas which can be harmful.

PROPER SOLDERING

Joint clearances should be maintained so that the brazing alloy will flow between the closely mated surfaces rather than forming large fillets.

This films make the strongest joints, capillary attraction also work best with close tolerance.

The best clearance is between 0.001" to 0.003", the amount of lap will be approximately 3/8" depending on the swaging tool used. (Figure 1.)

CLEANING TUBING

To make a sound, leak tight joint, the brazing alloy when raised to brazing temperature, must wet and flow freely over the entire surface of the tubing in the joint area.

To assure this, the tubing surfaces must be free of all dirt, grease, oil and oxides otherwise the alloy will not wet and flow properly over any surface with these elements present. Cleaning can be done with an abrasive cloth or steel wool. Never blow into the tubing because this will introduce a lot of moisture into the system. Open tubing joints should be covered if exposed for long periods of time.

PROPER FLUXING

Flux is necessary when using silver solder; it is not required when using silfos on copper to copper joints.

To do a good job the flux should cover the tube surface completely. Be careful not to introduce any flux inside the tubing.

Fluxing should be done after the tubing is mated together and just before brazing is done. Do not allow it to dry out.

When brazing, the flux should become entirely liquid and clear, like water. The temperature will be at 1100°F and only a little more heat will allow the alloy to flow freely into the joint.

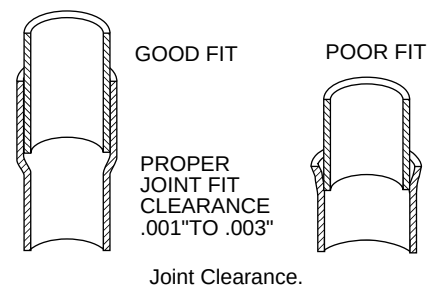


Figure 1

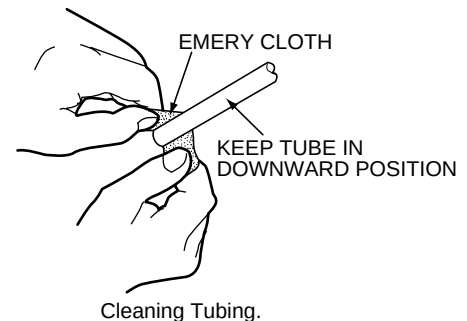
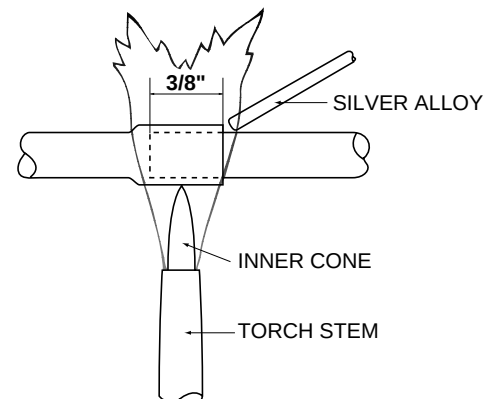


Figure 2



Directing Torch Flame to Copper Tubing.

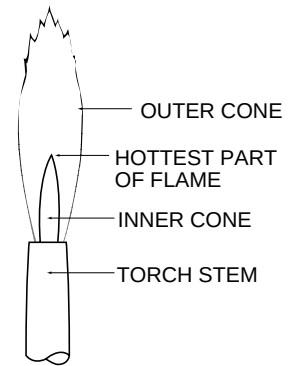
Figure 3

HEATING THE TUBING

Direct the torch flame so that the larger tube receives most of the heat. Silver solder flows at 1200°F and silfos flows at 1300°F.

Heat all around the tubing.

The flame is composed of two cones, a smaller inner cone (pale blue) in color and a much larger outer cone. The hottest part of the flame is at the tip of the inner cone. The flame should be directed at the joint with the tip of the cone just touching the surface of the tubing. Figure 3 and 4.



Composition of Torch Flame.

Figure 4

DEHYDRATING SEALED SYSTEM

Many servicers feel that since air conditioners run with evaporator temperatures above 33°F, moisture will not present a problem. Nothing is further from the truth. Oxygen in moisture plus the heat produced during compression will react with the refrigerant oil to produce harmful acids in the system which will break down motor winding insulation, create sludge and pit component parts, reducing efficiency of the air conditioner and shortening the life of compressors.

There it becomes mandatory that good dehydrating practices be adhered to at all times.

Proper hook up procedures as shown in Figure 5 must be used in order to pull and good vacuum from the system.

The use of a good vacuum pump is very important so that the boiling point of any water in the system will be lowered to a point where it will vaporize and be expelled from the system in the form of vapor.

Type of evacuation methods

1. **Piston Type Compressor** No good.
System parts must be above 110 °F.
2. **Rotary Vacuum Pump** Disadvantages.
Low CFMC. 4 oil gets dirty.
3. **Single State Vacuum Pump** will not clean oil.
Oil must be changed often.
4. **Two Stage Vacuum Pump** will reach 50 microns.
First stage is below atmospheric pressure.
Moisture is removed into second stage which works up to atmospheric pressure thus keeping oil clean.
Manometer cannot be read to 1/2 mm. Micron gauge reads from 25,400 microns to 0.

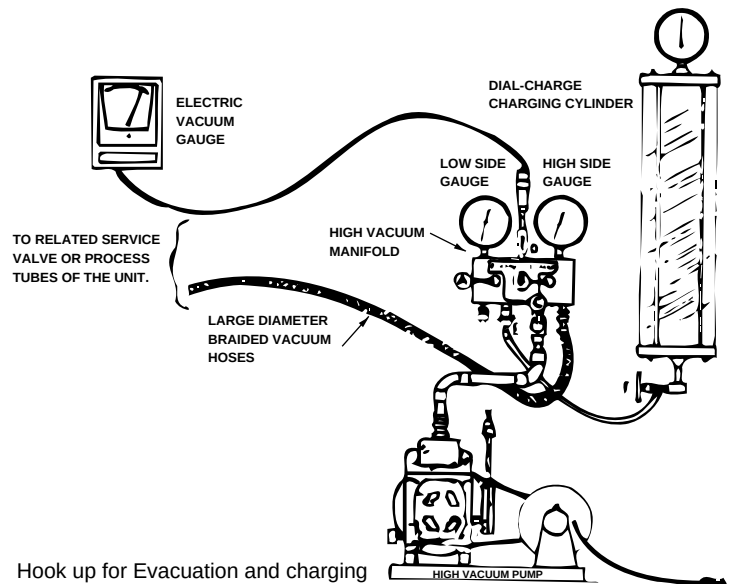


Figure 5

It becomes clear that good equipment and maintained properly must be used in order to remove air and moisture from the system.

When a vacuum of 1,000 to 500 microns is reached, block off the vacuum pump from the system.

This is done by closing the value between the pump and system. If the micron gauge does not increase above 1,000, the system is free of moisture and no leak exists. If the micron gauge increases to higher levels moisture or a leak exists.

LEAKS

Several methods are used to detect leaks in systems.

Electronic Leak Detectors are very sensitive and are able to detect leaks down to 1/2 ounce per year.

A good electronic leak detector is generally far better in locating very small leaks.

Halide Torch be sure the room is free from refrigerant vapors. Watch the flame for the slightest change in color.

A very faint green indicates a small leak. The flame will be unmistakably changed to green or purple when large leaks are encountered. To simplify leak detection pressurize the system to approximately 75 lbs. Some leaks can be located by a visual inspection of the system components and solder joints and if oil is found at any given location it generally is a sign that a leak exists at that point due to the fact that flame does carry oil with it travels through the system.

Soap Bubbles

Liquid detergents can sometimes assist in finding small leaks by brushing detergent on the suspect area and watching for bubbles. Before applying detergent be sure that the system is pressurized.

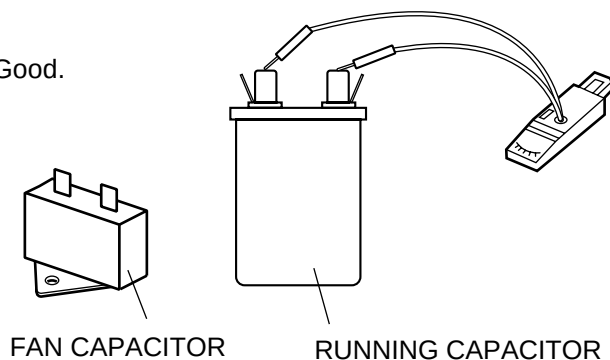
Tap line devices are permissible for diagnosis only they are not suitable when evacuating the system. After the diagnosis has been made they must be removed so that the system will be restored to a hermetically sealed condition.

ELECTRICAL COMPONENT TEST

RUNNING CAPACITOR AND FAN CAPACITOR

CAUTION: DISCHARGE THE RUNNING CAPACITOR AND FAN CAPACITOR BEFORE TOUCHING CAPACITOR OR WIRING.

- (1) Discharge capacitor by shorting terminals.
- (2) Take the wires off the capacitor terminals.
- (3) Set the selector switch of a volt-ohm-meter(or a tester) on the resistance range.
- (4) Connect the probes to the capacitor terminals and watch the indicator swing.
The indicator does not swing at all Open.
The indicator swings but does not return Shorted.
The indicator swings, then returns a moment later Good.



INSULATION TEST

Check the resistance between the terminals and case.
Reading must be more than 10M at DC 500V.

OVERLOAD RELAY

Check continuity between terminals with volt-ohm-meter.

INSULATION TEST

Check resistance between terminals and the relay case.
Reading must be more than 10M at DC 500V.

COMPRESSOR

- (1) Take the wires off compressor terminals.
- (2) Set selector switch of volt-ohm-meter on the resistance range.
- (3) Put the probes on the terminals of the compressor and check continuity between each terminal.

INSULATION TEST

Check the resistance between the terminals and the copper tube.
Reading must be more than 10M at DC 500V.

MICROCOMPUTER CONTROL SYSTEM

1. Temperature control characteristic

1-1 COOL operation

In the "COOL" mode, the thermostat circuit is controlled by two thermostat lines (C1, C2).

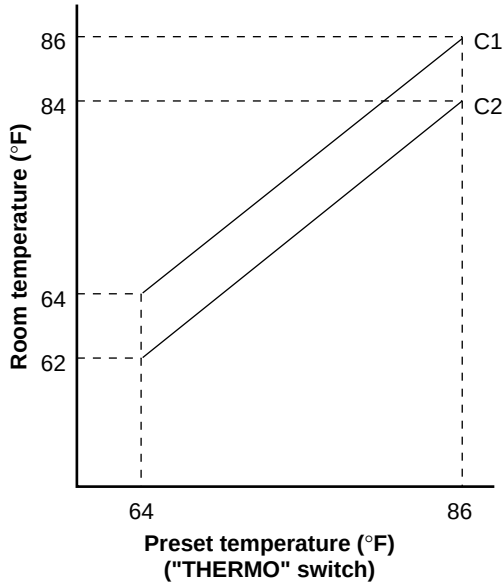


Figure Y-1

2. Operation mode

2-1 COOL operation

The compressor turns on or off, at thermostat lines C1 and C2. The fan motor is also controlled with the compressor.

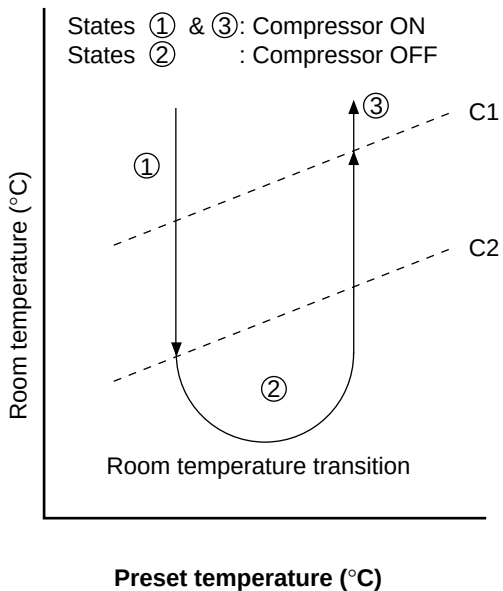


Figure Y-2

2-2 FAN ONLY operation

The fan motor always turns on.

3. Fan speed

Fan speeds are given by the fan motor, "H", "M" and "L", which are available in the following operation mode.

Table Y-1

Selector	Fan motor
HIGH COOL	H
MED COOL	M
LOW COOL	L
FAN ONLY	M

4. 12-hours timer

4-1 OFF-TIMER operation

Set the delay timer during operation.

The unit will turn off automatically according to your setting. Timer duration can be set by 0.5 hours to maximum 12 hours. Up to 9.5 hours, you can set by 0.5 hours increments and from 10 to 12 hours, by 1 hour increment.

If you touch button "POWER ON/OFF" during OFF-TIMER operation, then the unit turns off and OFF-TIMER operation is cancelled.

4-2 ON-TIMER operation

Set the delay timer when unit is not operating.

The unit will turn on automatically according to your setting. Timer duration can be set by 0.5 hours to maximum 12 hours. Up to 9.5 hours, you can set by 0.5 hours increments and from 10 to 12 hours, by 1 hour increment.

If you touch button "POWER ON/OFF" during ON-TIMER operation, then the unit turns on and ON-TIMER operation is cancelled.

ON-TIME and OFF-TIME display will count down the remaining time.

from 0.5 to 9.5 0.5 hours
from 10 to 12 1 hour

5. Energy saver

During normal operation, the thermostat automatically controls cooling and the fan runs continuously whenever the air conditioner is in operation.

When the ENERGY SAVER is set, the thermostat automatically controls cooling and the fan automatically stop when compressor is not operating. (Fan will stop in 30 seconds after the compressor stops.)

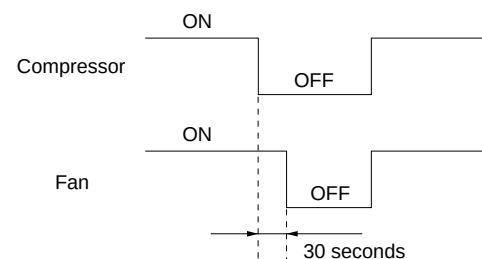


Figure Y-3

6. Safety start

When you turn the air conditioner OFF and restart again soon, wait at least 3 minutes before the cooling operation starts.

7. Test mode

Keep pushing both buttons "POWER ON/OFF" and "▼" and supply the power, the system will go to the test mode. In this mode, the output operation is switched by pushing buttons. Normal outputs are shown in Table Y-2.

Table Y-2

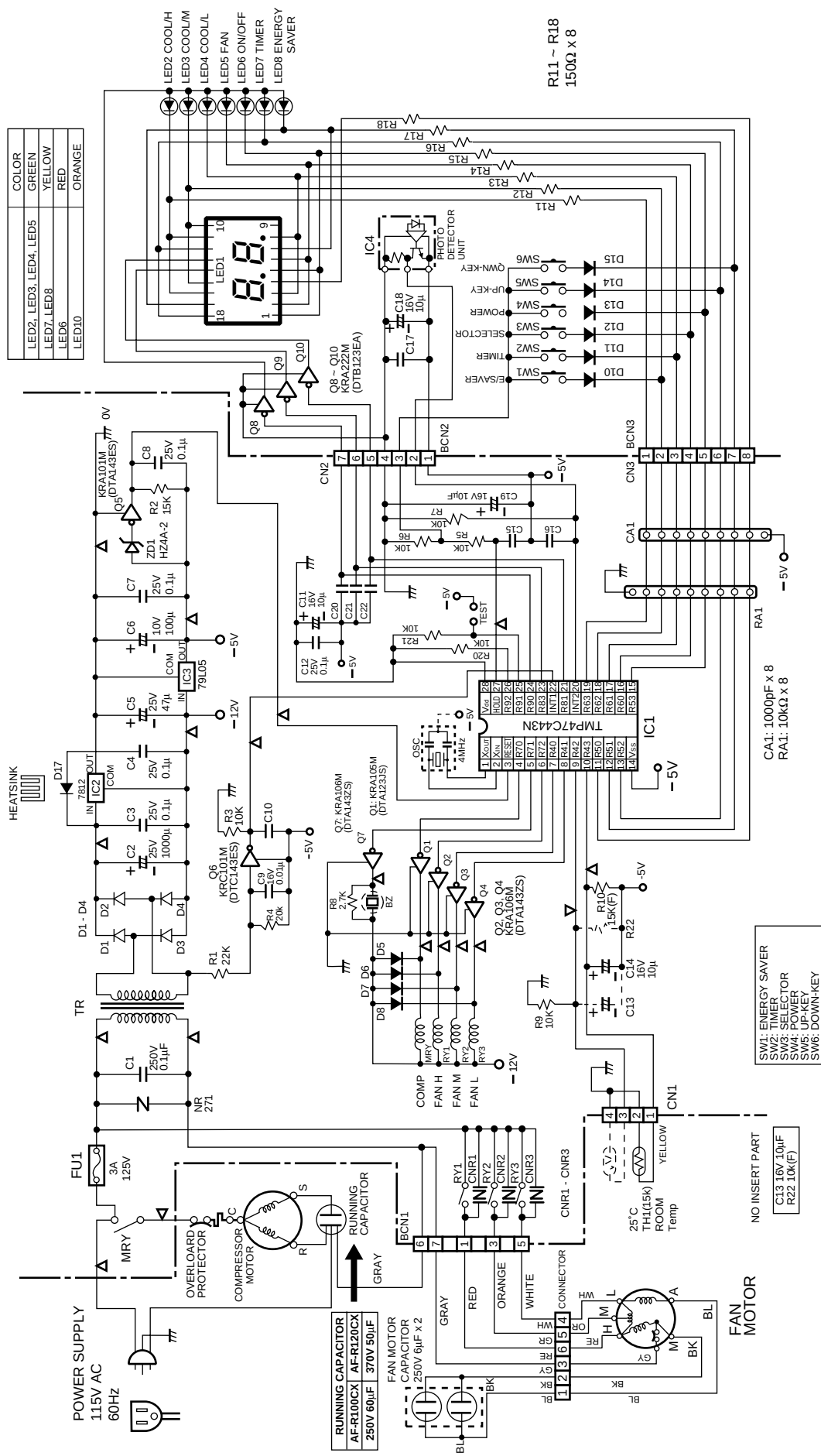
No.	Push key (Switch)	LED1	Input-check	LED lighting							Output-check		Check item and Remark	
			TH1 Open/Short check Indicator by LED2	HIGH COOL [LED2]	MED COOL [LED3]	LOW COOL [LED4]	FAN ONLY [LED5]	POWER ON/OFF [LED6]	TIMER [LED7]	ENERGY SAVER [LED8]	FAN output	COMP output		
0	Plug in the power supply cord while pushing POWER ON/OFF key and ▼(down) key.	8.8	×	⊙	⊙	⊙	⊙	⊙	⊙	⊙	OFF	OFF	All LEDs lighting	
1	SLECTOR (SW3)	0.1	●	TH: OK	×	⊙	⊙	⊙	⊙	⊙	LOW	OFF	FAN output check	
2	SLECTOR (SW3)	0.1	●	TH: OK	×	⊙	⊙	⊙	⊙	⊙	MED	OFF		
3	SLECTOR (SW3)	0.1	●	TH: OK	×	⊙	⊙	⊙	⊙	⊙	HIGH	OFF		
4	POWER "ON/OFF" (SW4)	0.2	×	⊙	⊙	⊙	⊙	⊙	⊙	⊙	OFF	OFF	Key operation check	
5	UP (SW5)	0.3	●	TH: OK	×	⊙	⊙	⊙	⊙	⊙	LOW	OFF		
6	DOWN (SW6)	0.4	●	TH: OK	×	⊙	⊙	⊙	⊙	⊙	MED	OFF		
7	TIMER (SW2)	0.5	●	TH: OK	×	⊙	⊙	⊙	⊙	⊙	HIGH	OFF		
8	ENERGY SAVER (SW1)	0.6	×	⊙	⊙	⊙	⊙	⊙	⊙	⊙	OFF	OFF	Remote control operation check (Receive)	
9	POWER ON/OFF by the Remote control	0.6	●	TH: OK	×	⊙	⊙	⊙	⊙	⊙	LOW	OFF		
			TH1: OPEN/SHORTcheck(⊙=OK)									Comp.: Not output		
			● = Thermistor check included, × = Thermistor check not included											

Table Y-3

T(°C)	T(°F)	R(k)	※ V(volts)
0	32.0	49.33	1.17
1	33.8	46.86	1.21
2	35.6	44.53	1.26
3	37.4	42.33	1.31
4	39.2	40.25	1.36
5	41.0	38.29	1.41
6	42.8	36.44	1.46
7	44.6	34.68	1.51
8	46.4	33.02	1.56
9	48.2	31.45	1.61
10	50.0	29.96	1.67
11	51.8	28.55	1.72
12	53.6	27.22	1.78
13	55.4	25.96	1.83
14	57.2	24.76	1.89
15	59.0	23.62	1.94
16	60.8	22.56	2.00
17	62.8	21.52	2.05
18	64.4	20.55	2.11
19	66.2	19.63	2.17
20	68.0	18.76	2.22

T(°C)	T(°F)	R(k)	※ V(volts)
21	69.8	17.93	2.28
22	71.6	17.14	2.33
23	73.4	16.39	2.39
24	75.2	15.68	2.44
25	77.0	15.00	2.50
26	78.8	14.36	2.55
27	80.6	13.74	2.61
28	82.4	13.16	2.66
29	84.2	12.60	2.71
30	86.0	12.07	2.77
31	87.8	11.57	2.82
32	89.6	11.09	2.87
33	91.4	10.63	2.93
34	93.2	10.19	2.98
35	95.0	9.78	3.03
36	96.8	9.38	3.08
37	98.6	9.00	3.13
38	100.4	8.64	3.17
39	102.2	8.30	3.22
40	104.0	7.97	3.27

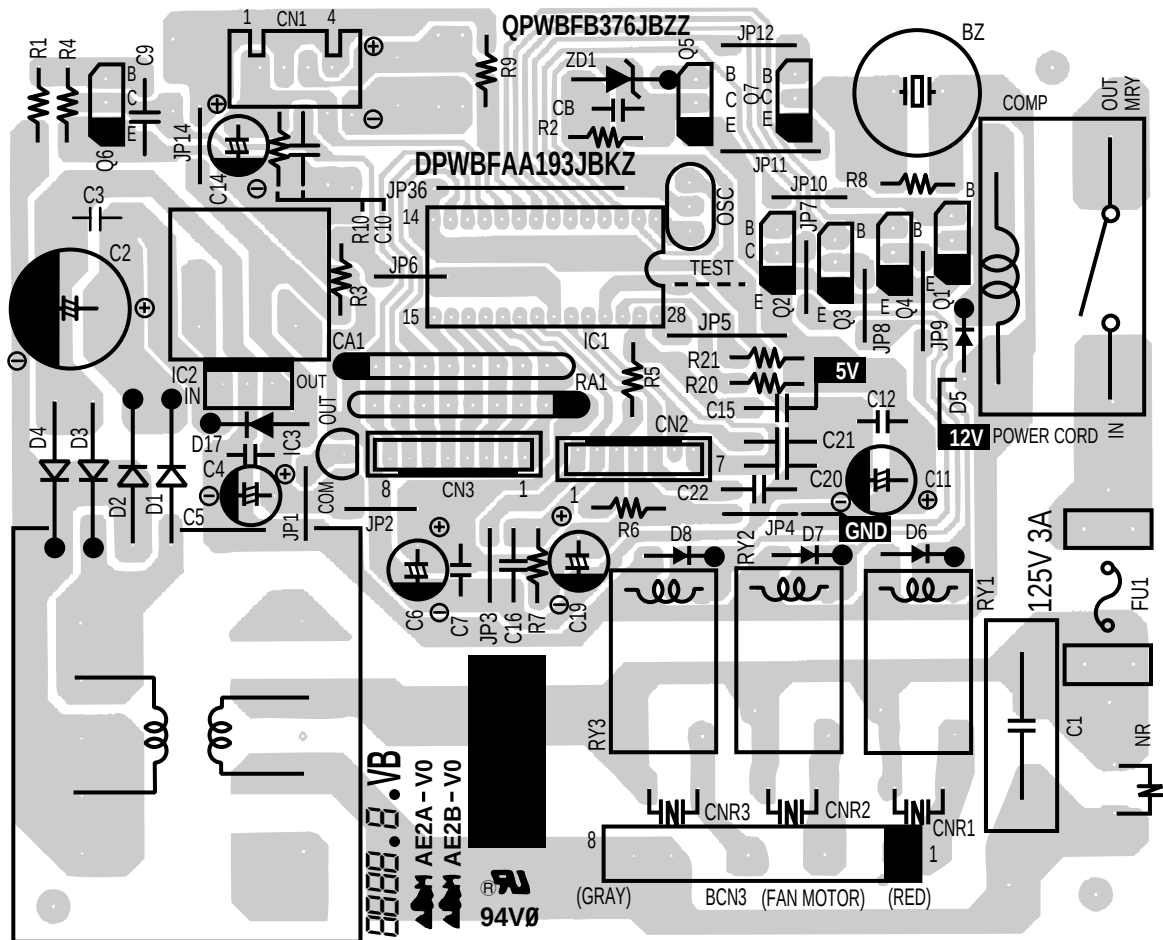
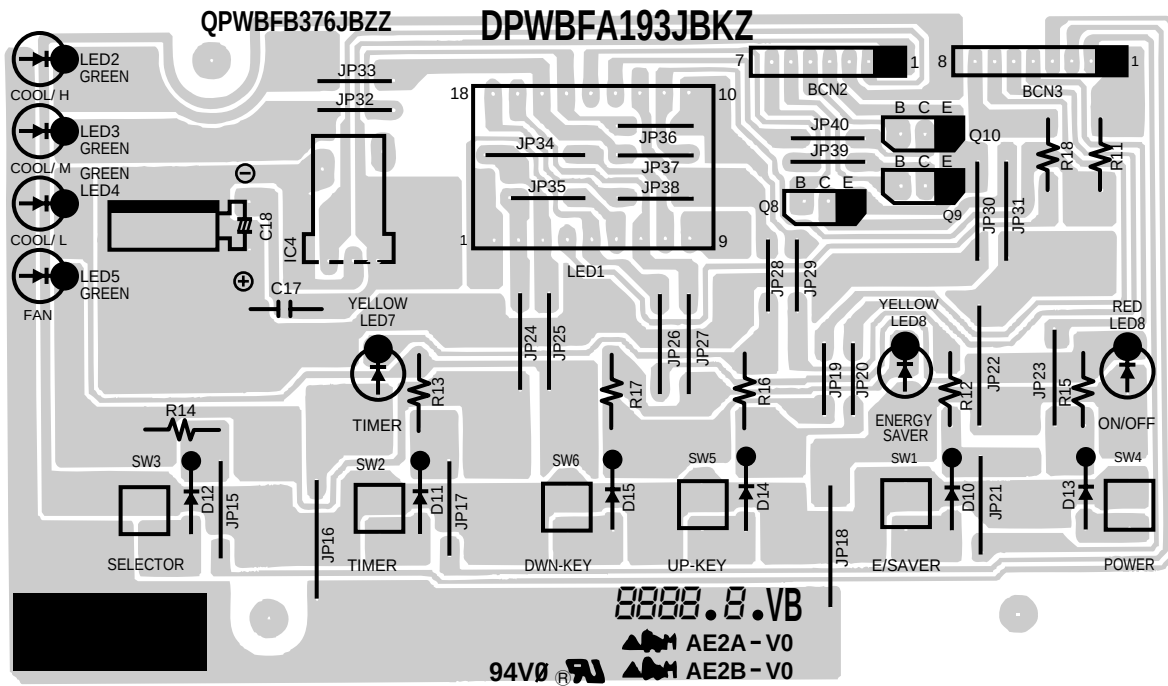
※ V Input the voltage of microcomputer (No. 10-port).



Electronic Control Circuit Diagram

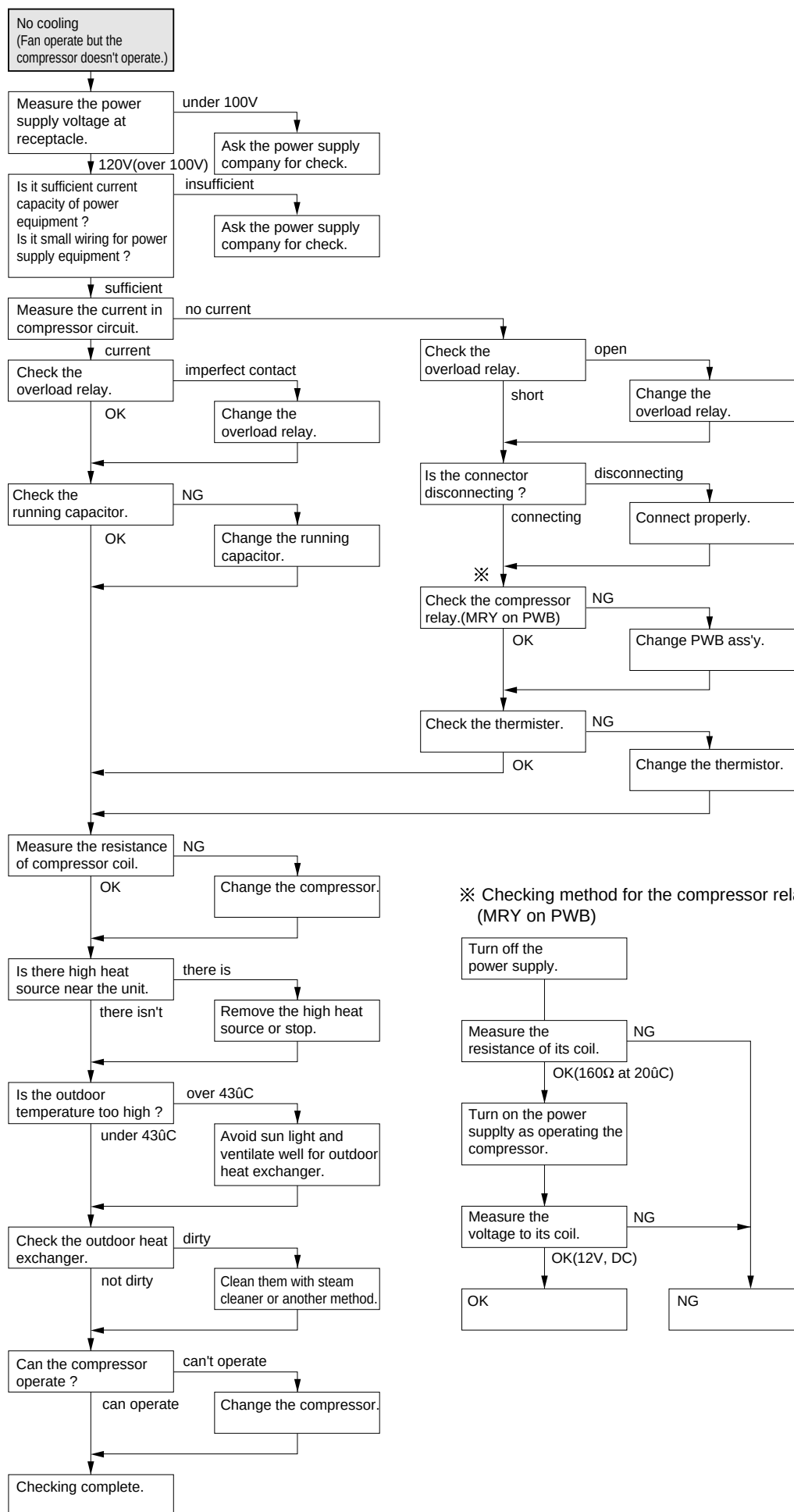
CA1: 1000PF x 8 (CAPACITOR ARRAY)
RA1: 10KΩ x 8 (RESISTOR ARRAY)

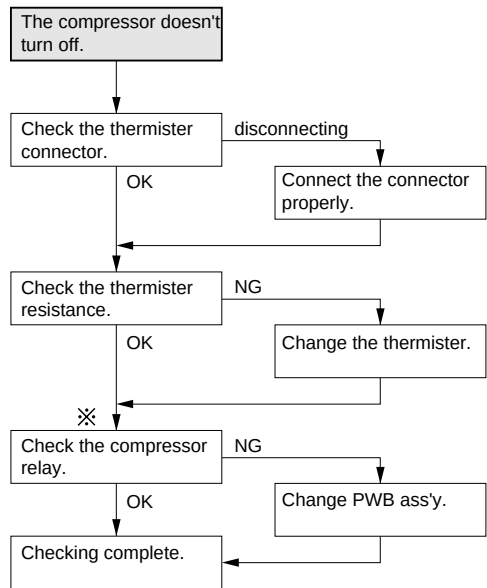
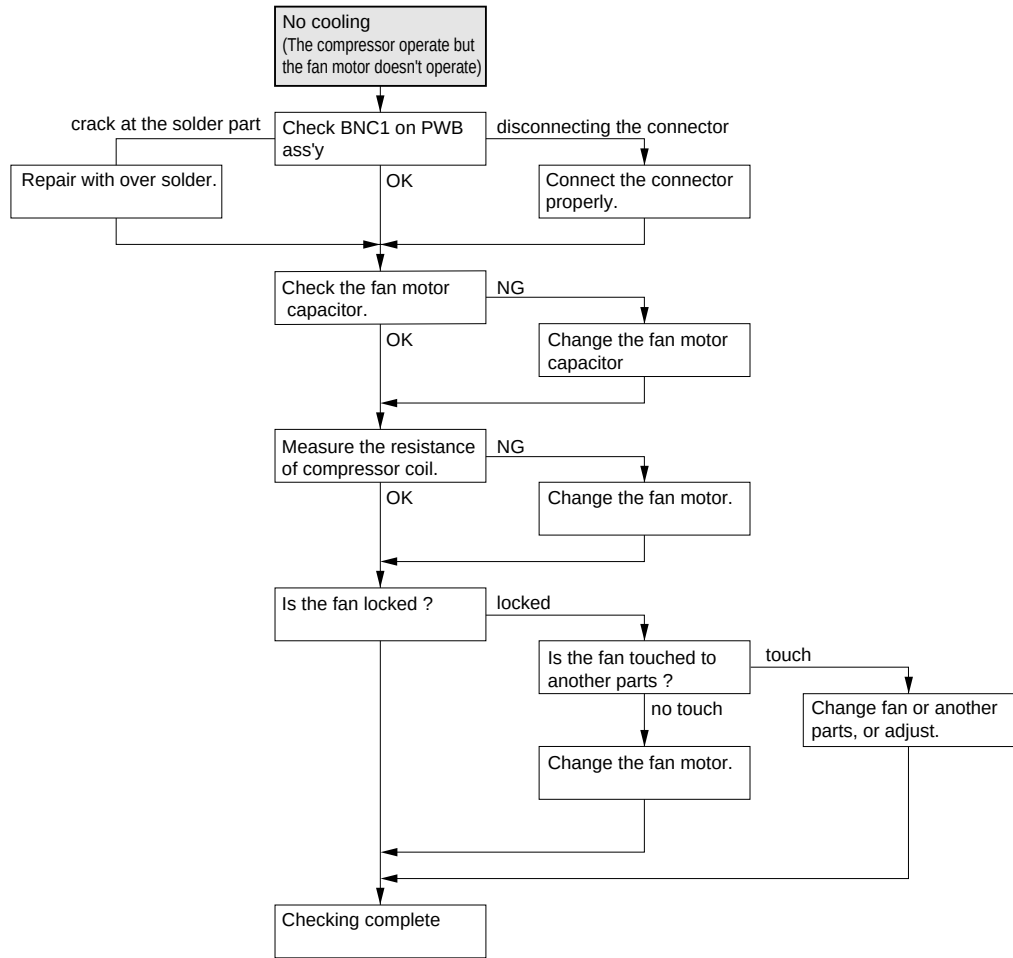
—△— IF NOT SPECIFIED 1/5W, ±5% (RESISTOR)
—|— IF NOT SPECIFIED 50V 1000PF (CAPACITOR)
—▶— IF NOT SPECIFIED 1SS133T-72 (DIODE)
△ : INDICATED POSITION IS FUNCTION TEST POINT



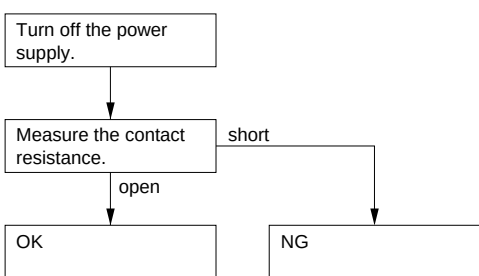
Printed Wiring Board

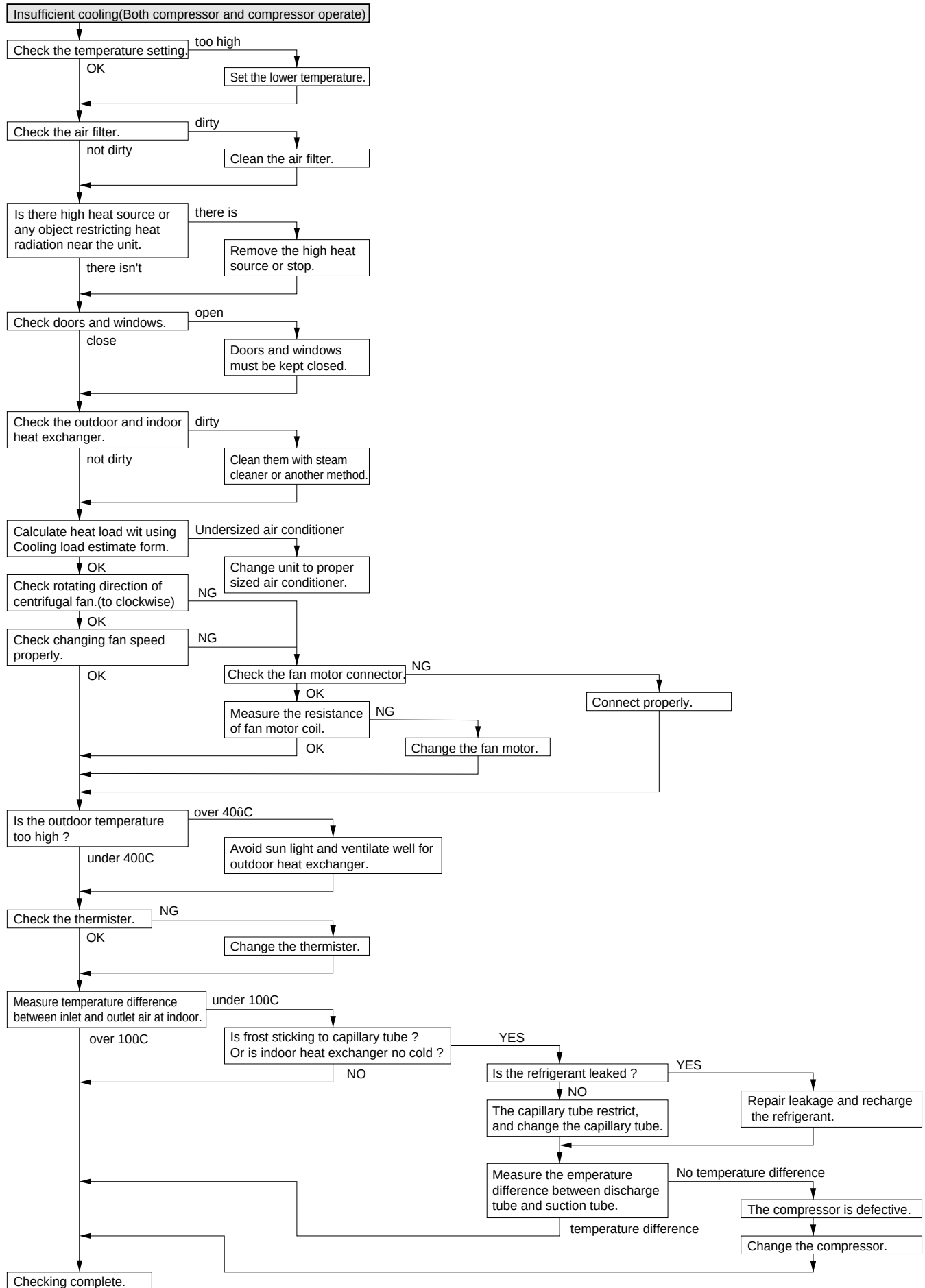


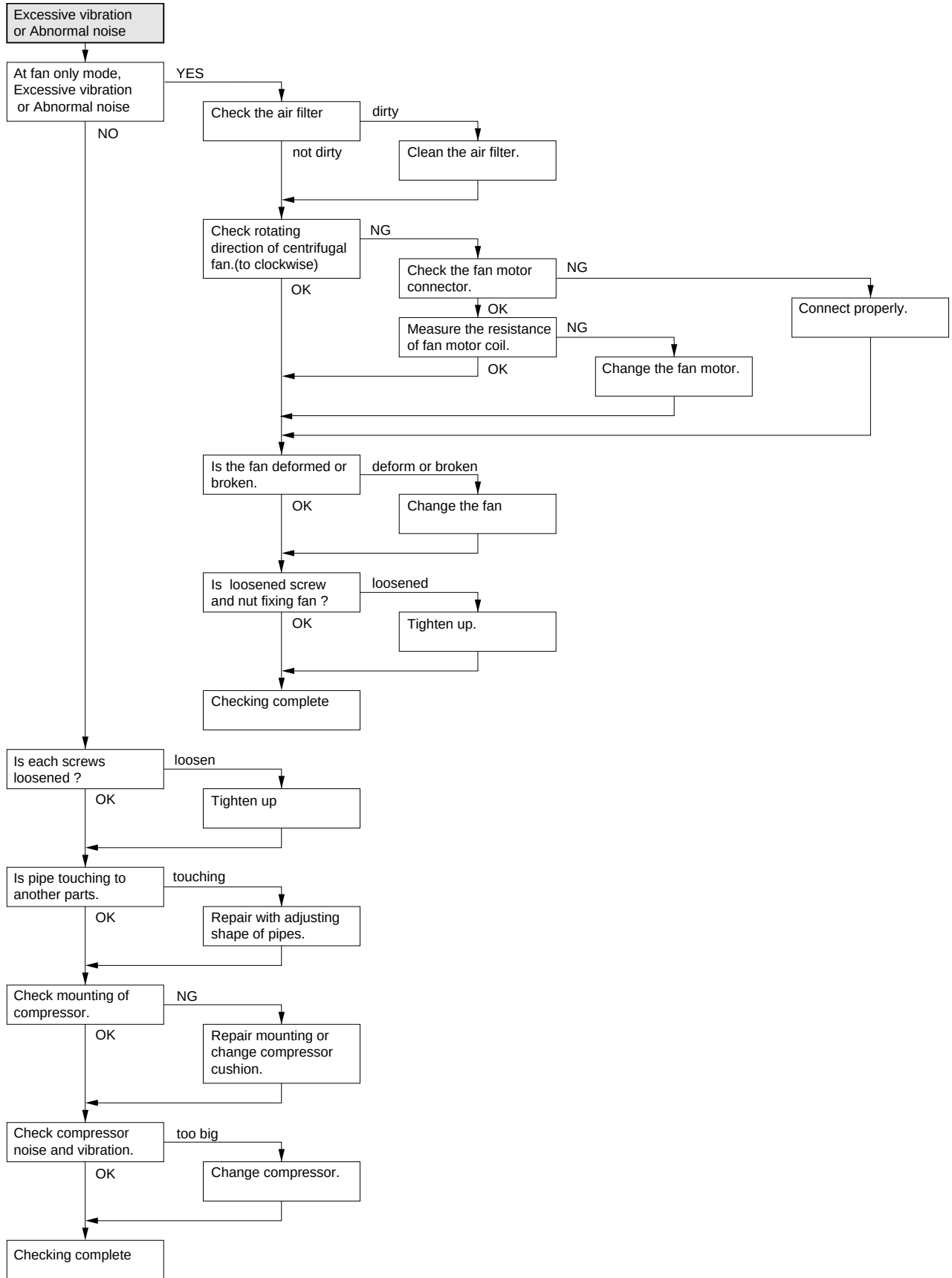




※ Checking method for the compressor relay.
(MRY and PWB)







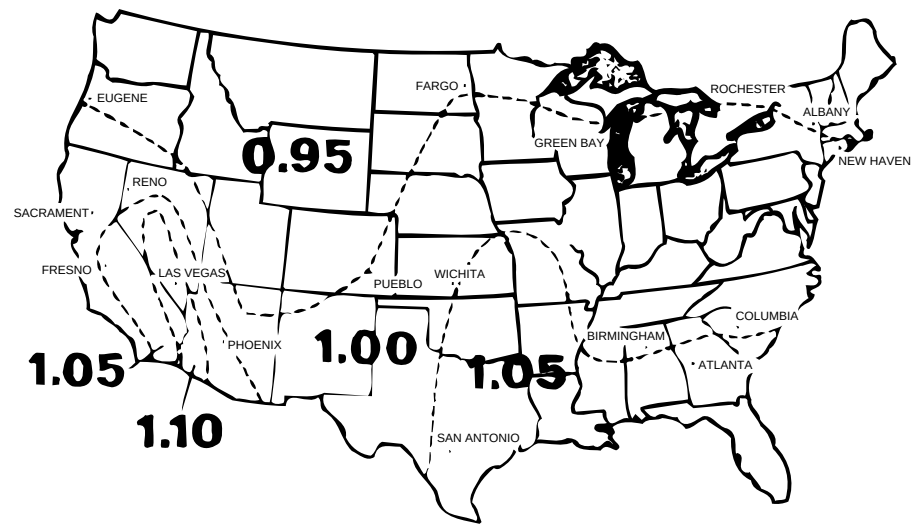
COOLING LOAD ESTIMATE FORM

INSTRUCTIONS FOR USING COOLING LOAD ESTIMATE FORM FOR ROOM AIR CONDITIONERS

(AHAM PUB. NO. RAC-1)

- A. This cooling load estimate form is suitable for estimating the cooling load for comfort air conditioning installations which do not require specific conditions of inside temperature and humidity.
- B. The form is based on an outside design temperature of 95°F dry bulb and 75°F wet bulb. It can be used for areas in the continental United States having other outside design temperature by applying a correction factor for the particular locality as determined from the map.
- C. The form includes "day" factors for calculating cooling loads in rooms where daytime comfort (such as living rooms, offices, etc.).
- D. The numbers of the following paragraphs refer to the correspondingly numbered item on the form:
 - 1. Multiply the square feet of window area for each exposure by the applicable factor. The window area is the area of the wall opening in which the window is installed. For windows shaded by inside shades or venetian blinds, use the factor for "Inside Shades". For windows shaded by outside awnings or by both outside awnings and inside shades (or venetian blinds), use the factor for "Outside Awnings". "Single Glass" includes all types of single thickness windows, and "Double Glass" includes sealed air space types, storm windows, and glass block. Only one number should be entered in the right-hand column for item 1, and this number should represent only the exposure with the largest load.
 - 2. Multiply the total square feet of all windows in the room by the applicable factor.
 - 3a. Multiply the total length (linear feet) of all walls exposed to the outside by the applicable factor. Doors should be considered as being part of the wall. Outside walls facing due north should be calculated separately from outside walls facing other directions. Walls which are permanently shaded by adjacent structures should be considered as being "North Exposure". Do not consider trees and shrubbery as providing permanent shading. An insulated frame wall or a masonry wall 8 inches or less in thickness is considered "Light Construction". An insulated frame wall or a masonry wall over 8 inches in thickness is considered "Heavy Construction".
 - 3b. Multiply the total length (linear feet) of all inside walls between the space to be conditioned and any unconditioned spaces by the given factor. Do not include inside walls which separate other air conditioned rooms.
 - 4. Multiply the total square feet of roof or ceiling area by the factor given for the type of construction most nearly describing the particular application. (Use one line only.)
 - 5. Multiply the total square feet of floor area by the factor given. Disregard this item if the floor is directly on the ground or over a basement.
 - 6. Multiply the number of people who normally occupy the space to be air conditioned by the factor given. Use a minimum of 2 people.
 - 7. Determine the total number of watts for lights and electrical equipment, except the air conditioner itself, that will be in use when the room air conditioning is operating. Multiply the total wattage by the factor given.
 - 8. Multiply the total width (linear feet) of any doors or arches which are continually open to an unconditioned space by the applicable factor.
NOTE: Where the width of the doors or arches is more than 5 feet, the actual load may exceed the calculated value. In such cases, both adjoining rooms should be considered as a single large room, and the room air conditioner unit or units should be selected according to a calculation made on this new basis.
 - 9. Total the loads estimated for the foregoing 8 items.
 - 10. Multiply the sub total obtained in item 9 by the proper correction factor, selected from the map, for the particular locality. The result is the total estimated design cooling load in BTU per hour.
- E. For best results a room air conditioner unit or units having a cooling capacity rating (determined in accordance with the NEMA Standards Publication for Room Air Conditioners, CN 1-1960) as close as possible to the estimated load should be selected. In general, a greatly oversized unit which would operate intermittently will be much less satisfactory than one which is slightly undersized and which would operate more nearly continuously.
- F. Intermittent loads such as kitchen and laundry equipment are not included in this form.

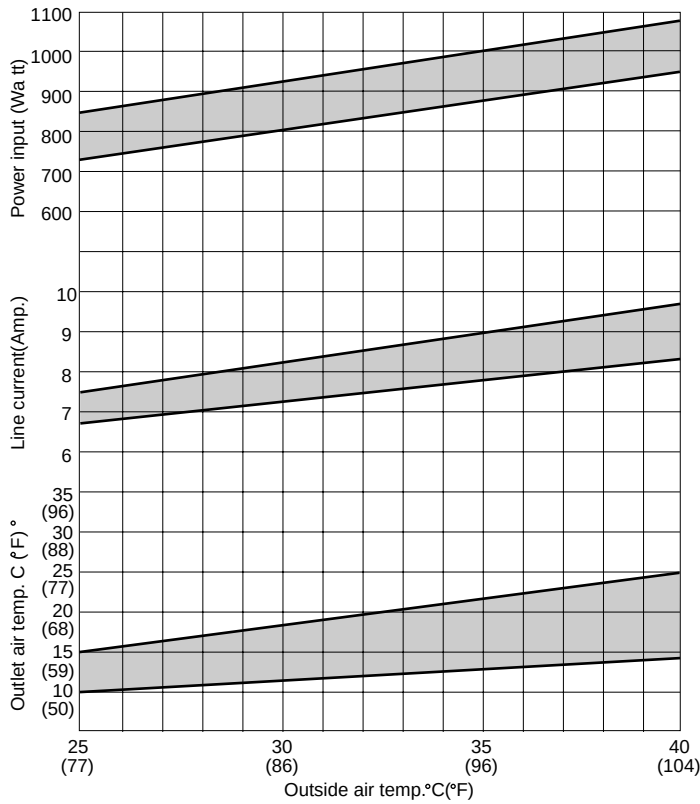
HEAT GAIN FROM	QUANTITY	FACTORS			BTU/Hr (Quantity x Factor)
		DAY			
		No Shades	Inside Shades	Outside Shades	(Area a Factor)
1. WINDOWS: Heat gain from sun.					
Northeast	_____ sq ft	60	25	20	Use _____
Southeast	_____ sq ft	80	40	25	only _____
South	_____ sq ft	75	30	20	the _____
Southwest	_____ sq ft	75	35	20	largest _____
Southeast	_____ sq ft	110	45	30	load _____
West	_____ sq ft	150	65	45	Use _____
Northwest	_____ sq ft	120	50	35	only _____
North	_____ sq ft	0	0	0	only _____
These factors are for single glass only. For glass block, multiply the above factors by 0.5; for double-glass or storm windows, multiply the above factors by 0.8.					
2. WINDOWS: Heat gain by conduction. (Total of all windows)					
Single glass	_____ sq ft			14	_____
Double glass or glass block	_____ sq ft			7	_____
3. WALLS: (Based on linear feet of wall.)					
a. Outside walls			Light Construction	Heavy Construction	
Noth exposure	_____ ft		30	20	_____
Other than North exposure	_____ ft		60	30	_____
b. Inside Walls (between conditioned and unconditioned spaces only)	_____ ft			30	_____
4. ROOF OR CEILING: (Use one only.)					
a. Roof, uninsulated	_____ sq ft			19	_____
b. Roof, 1 inch or more insulation	_____ sq ft			8	_____
c. Ceiling, occupied space above.	_____ sq ft			3	_____
d. Ceiling, insulated with attic space above	_____ sq ft			5	_____
e. Ceiling, uninsulated, with attic space above	_____ sq ft			12	_____
5. FLOOR: (Disregard if floor is directly on ground or over basement.) _____ sq ft					
6. NUMBER OF PEOPLE: 600					
7. LIGHTS AND ELECTRICAL EQUIPMENT IN USE _____ watts					
8. DOORS AND ARCHES CONTINUOUSLY OPENED TO UNCONDITIONED SPACE: (Linear feet of width.) _____ ft					
9. SUB-TOTAL x x x x x x x x x x x					
10. TOTAL COOLING LOAD: (BTU per hour to be used for selection of room air conditioner(s).) _____ (Item 9) x _____ (Factor from Map) = _____					



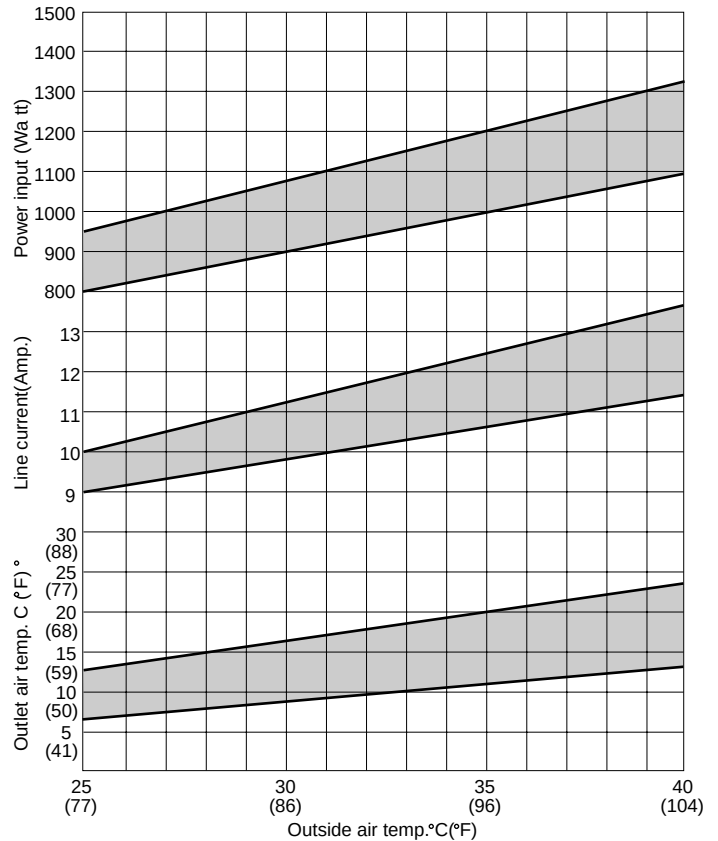
RUNNING CONDITION

- Note:
1. Select mode of the Running Condition of a Room Air Conditioner.
SELECTOR HIGH COOL
TEMPERATURE 64°F
 2. Data of Performance Curve is measured between 40RH% and 70RH%.
If you measure the Room Air Conditioner above or below this rating, the data may miss the range of the performance curve.
 3. Outlet air temp. is influenced by the method of measurement. Measurement examples are shown.
 4. Use power input data when checking the Running Condition.

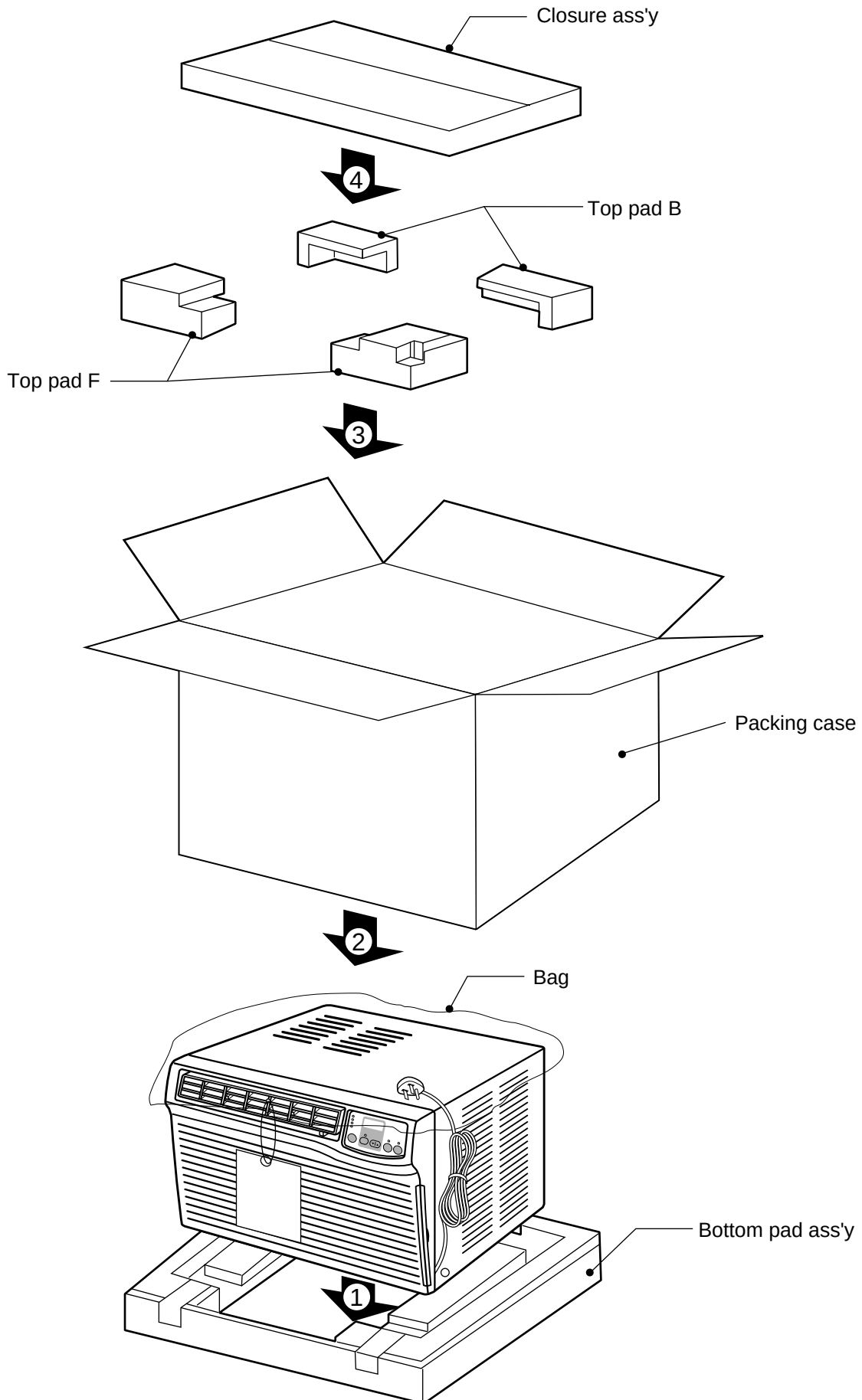
**RUNNING CONDITION FOR
MODEL AF-R100CX
PERFORMANCE CURVE**



**RUNNING CONDITION FOR
MODEL AF-R120CX
PERFORMANCE CURVE**



PACKING AND ACCESSORIES



REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
CABINET AND UNIT PARTS				
1- 1	CMOTLA895JBEZ	Fan motor	1	BN
1- 2	DCHS-A442JBTA	Base pan ass'y [AF-R100CX]	1	BC
1- 2	DCHS-A440JBTA	Base pan ass'y [AF-R120CX]	1	BC
1- 3	DCAB-A094JBTA	Cabinet ass'y	1	BF
1- 4	PSEL-B150JBE0	Cabinet seal	2	AD
1- 5	HPNLCA770JBFA	Control panel	1	AF
1- 6	PSEL-C059JBEZ	Evaporator insulator	1	AD
1- 7	LANG-A459JBWZ	Conecting stay	1	AC
1- 8	LANG-A355JBTA	Top inst. Angle	1	AP
1- 9	LHLD-A482JBFZ	Thermistor holder	1	AE
1-10	CLEV-A035JBKZ	Damper ass'y	1	AE
1-11	NFANPA092JBFZ	Propeller fan	1	AV
1-12	NFANSA030JBFZ	Centrifugal fan	1	AU
1-13	PFILMA116JBEB	Air filter	1	AN
1-14	PFPFPB466JBE0	Insulator	2	AC
1-15	PKESPA082JBTA	Condenser shroud	1	AV
1-16	PKESPA083JBFA	Orifice	1	AQ
1-17	LBND-A046JBE0	Wire fixing band	1	AE
1-18	LCOV-A002JBF0	Shroud cover	1	AM
1-19	PCOV-A320JBP0	Motor cover	1	AC
1-20	PSEL-C057JBEZ	Tube insulator	1	AD
1-21	LANG-A356JBTA	Bottom inst. Angle	1	AE
1-22	PSKR-A207JBFA	Bulkhead	1	BA
1-23	PSRA-A120JBFZ	Drain tray	1	AE
1-24	TLAB-C206JBRZ	Energy card [AF-R100CX]	1	AC
1-24	TLAB-C205JBRZ	Energy card [AF-R120CX]	1	AC
1-25	TSPC-E052JBRZ	Name badge [AF-R100CX]	1	AC
1-25	TSPC-E051JBRZ	Name badge [AF-R120CX]	1	AC
1-26	GWAKPA136JBFB	Louver duct	1	AH
1-27	GWAKPA135JBFB	Front panel	1	AT
1-28	TLABBA110JBRA	SHARP badge	1	AB
1-29	LANGAA038JBFB	Left closure frame	1	AK
1-30	LANGAA039JBFB	Right closure frame	1	AK
1-31	PPLTPA013JBFB	Closure	2	AL
1-32	PSPRCA010JBE0	Spring	1	AD
1-33	TLABKA564JBE0	Number card	1	AC
1-34	PFPFPB446JBE0	Insulator	1	AC
1-35	CWAK-C095JBKZ	Front panel ass'y	1	AX
1-36	MJNTPA074JBFB	Louver link	2	AC
1-37	MLOV-A252JBFB	Vertical louver A	4	AB
1-38	MLOV-A253JBFB	Vertical louver B	2	AC
1-39	PSEL-B360JBE0	Cabinet insulator	1	AB
1-40	PSEL-C064JBEZ	Drain tray insulator	1	AC
1-41	PSEL-B361JBE0	Cabinet insulator	2	AE
1-42	PSEL-B367JBE0	Cabinet insulator	2	AC
1-43	PSEL-B516JBE0	Base pan insulator	2	AC
1-44	PFPFPB443JBE0	Insulator	1	AC
1-45	PSEL-C063JBEZ	Bulkhead insulator	1	AC
1-46	PSEL-B519JBE0	Angle insulator	1	AD
1-47	PSEL-C056JBEZ	Motor seal	1	AE
1-48	LHLDW0367JBE0	Wire holder	1	AA
1-49	LHLDW0368JBE0	Wire holder	1	AA
1-50	PFPFPB528JBE0	Panel insulator	1	AD
1-51	PSEL-A432JBE0	Damper insulator	1	AC
1-52	PFPFPB611JBE0	Insulator	1	AG
1-53	PSEL-B532JBE0	Damper insulator	1	AB
1-54	PSEL-B394JBE0	Panel insulator	1	AB
1-55	PSEL-B560JBE0	Damper insulator	1	AB
1-56	LANG-A507JBWZ	Fan motor angle	1	AH
1-57	HPNLCA771JBFA	Decoration panel	1	AM
1-58	PSEL-B366JBE0	Panel insulator	1	AD
1-59	PSEL-C104JBEZ	Insulator	1	AB
1-60	PSEL-C105JBEZ	Cabinet insulator	1	AE
1-61	LHLDW0363JBE0	Wire holder	1	AA
1-62	PSHE-A191JBEZ	Sheet	1	AE
1-63	LHLD-A356JBE0	Wire holder [AF-R120CX]	1	AE

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
CONTROL BOX PARTS				
2- 1	LBNDKA078JBWZ	Capacitor clamp [AF-R100CX]	1	AD
2- 1	LBNDKA096JBWZ	Capacitor clamp [AF-R120CX]	1	AC
2- 2	LPLTMA128JBW0	Control box cover	1	AK
2- 3	DPLT-A047JBW0	Cont. box angle ass'y	1	AS
2- 4	QACC-A263JBZZ	Power supply cord	1	AT
2- 5	RH-HXA011JBZZ	Thermistor	1	AL
2- 6	QW-VZD104JBE0	Lead wire	1	AD
2- 7	QW-IZA037JBZZ	Lead wire [AF-R100CX]	1	AS
2- 7	QW-IZA036JBZZ	Lead wire [AF-R120CX]	1	AS
2- 8	RC-HZA256JBE0	Fan motor capacitor	2	AM
2- 9	RC-HZA435JBZZ	Running capacitor [AF-R100CX]	1	AY
2- 9	RC-HZA407JBZZ	Running capacitor [AF-R120CX]	1	AY
2-10	TLABCB579JBRZ	Wiring diagram [AF-R100CX]	1	AA
2-10	TLABCB377JBRZ	Wiring diagram [AF-R120CX]	1	AC
2-11	DPWBFA193JBKZ	Control board unit	1	BC
2-12	PSPA-A084JBE0	Spacer	2	AC
2-13	PSPA-A085JBE0	Spacer	1	AC
2-14	QFS-AA048JBE0	Fuse	1	AB
2-15	LBND-A042JBE0	Wire fixing band	4	AC

CYCLE PARTS

3- 1	PCMPRA360JBEZ	Compressor [AF-R100CX]	1	CB
3- 1	PCMPRA359JBEZ	Compressor [AF-R120CX]	1	CC
3- 2	PPIPCF657JB1Z	Discharge tube [AF-R100CX]	1	AP
3- 2	PPIPCF655JB1Z	Discharge tube [AF-R120CX]	1	AR
3- 3	PPIPCF656JB1Z	Suction tube [AF-R100CX]	1	AP
3- 3	PPIPCF654JB1Z	Suction tube [AF-R120CX]	1	AS
3- 4	RHOG-A199JBZZ	Overload relay [AF-R100CX]	1	AU
3- 4	RHOG-A198JBZZ	Overload relay [AF-R120CX]	1	AT
3- 5	DCON-A166JBKZ	Condenser ass'y [AF-R100CX]	1	BT
3- 5	DCON-A167JBKZ	Condenser ass'y [AF-R120CX]	1	BT
3- 6	PEVA-A429JBEZ	Evaporator [AF-R100CX]	1	BP
3- 6	PEVA-A424JBEZ	Evaporator [AF-R120CX]	1	BQ
3- 7	GLEG-A103JBE0	Compressor cushion [AF-R100CX]	3	AG
3- 7	GLEG-A105JBE0	Compressor cushion [AF-R120CX]	3	AF
3- 8	PSEL-B161JBE0	Gasket washer [AF-R100CX]	1	AH
3- 9	PCOV-A371JBE0	Terminal cover [AF-R100CX]	1	AF
3- 9	PCOV-A321JBE0	Terminal cover [AF-R120CX]	1	AR
3-10	PSEL-B160JBE0	Terminal gasket [AF-R100CX]	1	AH
3-10	PSEL-A971JBE0	Terminal gasket [AF-R120CX]	1	AN
3-11	DCPY-A235JBKZ	Capillary tube ass'y [AF-R100CX]	1	AT
3-11	DCPY-A234JBKZ	Capillary tube ass'y [AF-R120CX]	1	AW
3-12	MSPR-A129JBE0	Cycle spring	1	AD
3-13	PGUM-0034JBE0	Damper rubber	1	AF
3-14	MSPR-A114JBE0	Protector spring [AF-R100CX]	1	AF
3-14	MSPR-A136JBE0	Protector spring [AF-R120CX]	1	AF
3-15	LPLTMA114JBW0	Condenser stay	2	AH

ACCESSORY PARTS

4- 1	TINSEA320JBRZ	Operation manual	1	AD
4- 2	PSEL-A349JBE0	Window insulator	1	AE
4- 3	PSEL-A350JBE0	Window insulator	1	AD
4- 4	PSEL-B365JBE0	Window insulator	1	AD
4- 5	TCAD-A351JBEZ	Consumer card	1	AB
4- 6	DX-BZA027JBK0	Screws kit	1	AE
4- 7	CRMC-A526JBEZ	Remote control	1	AT
4- 8	LHLD-A389JBFB	Controller holder	1	AE
4- 9	SSAKAA017YDE0	Bag	1	AC
4-10	UBATUA027JBE0	Battery pack	1	AE

PACKING PARTS

5- 1	CPADBA688YDK0	Top pad ass'y	1	AL
5- 2	CPADBA009JBK0	Bottom pad ass'y	1	AT
5- 3	SPAKCA986JBEZ	Packing case [AF-R100CX]	1	AX
5- 3	SPAKCA985JBEZ	Packing case [AF-R120CX]	1	AX
5- 4	SSAKHA314YDE0	Protect	1	AD
5- 5	PPAK-A007JBE0	Inner packing	1	AG
5- 6	TLABMA309JBRZ	Feature card	1	AB
5- 7	SSAKAA053YDE0	Bag	1	AB

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
SCREWS AND NUTS				
6- 1	XTTSD40P12000	Tapping screw	22	AA
6- 2	LX-BZA236JBE0	Special screw	1	AC
6- 3	XHTSD40P08000	Tap tight screw	8	AA
6- 4	LX-NZA148JBE0	Special nut [AF-R100CX]	1	AD
6- 4	LX-NZA136JBE0	Special nut [AF-R120CX]	1	AL
6- 5	LX-HZA001JBE0	Special screw	6	AB
6- 6	XCTSD40P10000	Tapping screw	19	AA
6- 7	LX-NZA074JBE0	Special nut	1	AB
6- 8	LX-NZA028JBE0	Special nut	3	AB
6- 9	XTPSD40P08000	Tapping screw	3	AA
6-10	XCTSD40P06000	Tapping screw	16	AA
6-11	XBPSD40P12J00	Machine screw	2	AB
6-12	LX-CZA038WRE0	Special screw	6	AA
6-13	XHTSD40P10000	Tap tight screw	2	AA
6-14	XTPSD40P12000	Tapping screw	2	AA

HOW TO ORDER REPLACEMENT PARTS

To have your order filled promptly and correctly, please furnish the following information.

1. MODEL NUMBER
2. REF. NO.
3. PART NO.
4. DESCRIPTION

